

THE SOLANACEOUS GENERA, *BROWALLIA*, *CAPSICUM*, *CESTRUM*, *CYPHOMANDRA*, *HYOSCYAMUS*, *LYCOPERSICON*, *NIEREMBERGIA*, *PHYSALIS*, *PETUNIA*, *SALPICHROA* AND *WITHANIA*, NATURALISED IN AUSTRALIA

D. E. Symon

Department of Agronomy, Waite Agricultural Research Institute, The University of Adelaide, Glen Osmond, South Australia, 5064

Abstract

Descriptions and distributions are given of the following Solanaceae in Australia: *Browallia americana* L., *Capsicum annuum* L. var. *annuum*, *C. annuum* var. *glabriusculum* (Dun.) Heiser & Pickersgill, *C. frutescens* L.; *Cestrum aurantiacum* Lindl., *C. elegans* (Brongn.) Schlecht., *C. nocturnum* L.; *C. parqui* L'Her.; *Cyphomandra crassifolia* (Ort.) Kuntze; *Hyoscyamus albus* L., *H. niger* L.; *Lycopersicon esculentum* Mill.; *Nierembergia hippomanica* Miers; *Physalis alkekengi* L., *P. ixocarpa* Brot. ex Hornem., *P. lanceifolia* Nees, *P. minima* L., *P. peruviana* L., *P. philadelphica* Lam., *P. pubescens* L., *P. virginiana* Mill., *P. viscosa* L.; *Petunia axillaris* (Lam.) B.S.P., *P. x hybrida* Vilm., *P. parviflora* Juss.; *Salpichroa origanifolia* (Lam.) Baill.; *Withania somnifera* L.

Introduction

This study was based on herbarium collections available in Australia. I have grown plants of *Capsicum*, *Petunia*, *Physalis*, *Salpichroa* and *Withania* for study purposes. Eleven genera of the family Solanaceae in Australia are considered. For the remaining genera with species naturalised in Australia, see *Datura*, Haegi (1976a), *Lycium*, Haegi (1976b), *Nicandra*, Horton (1979), *Nicotiana*, Horton (1981) and *Solanum*, Symon (1981, in press). *Atropa belladonna* L. has been grown as a drug crop, (Whittet, 1958, p. 351), or a garden novelty but it does not appear to be naturalised.

There are no recent collections of *Browallia*, only one of *Hyoscyamus* and few of *Nierembergia*. It seems doubtful if these genera are truly naturalised. However, common garden escapes tend to be poorly represented in herbaria (eg. *Lycopersicon*, *Cestrum*) and I am sure the specimens seen are an inadequate representation of the occurrences of many of these genera. I make a plea for more generous collection of garden escapes.

Key to genera of Solanaceae naturalised in Australia (Adapted from Haegi (1981) *Telopea* in press)

- 1. Anthers dehiscing by terminal pores or short slits ... 2
Anthers dehiscing by longitudinal slits running the full length of anther locule ... 3
2. Connective at back of anthers large and conspicuous ... 4. Cyphomandra
Connective at back of anthers small, inconspicuous ... 1. Solanum
3. Stamens 4 ... 4
Stamens 5 ... 5
4. Fruit a berry ... 2. Lycium
Fruit a capsule ... 1. Browallia
5. Fruit a capsule ... 6
Fruit a berry ... 11
6. Capsule more than 2cm long, spiny or tuberculate; calyx base only persistent in fruit ... 3. Datura
Capsule less than 1.5cm long, more or less smooth; whole calyx persistent in fruit ... 7
7. Capsule opening by circular slit around circumference to form apical lid; fruiting calyx enlarged, teeth becoming spiny ... 5. Hyoscyamus
Capsule opening from apex by longitudinal slits; fruiting calyx not or scarcely enlarged, teeth not becoming spiny ... 8

8. Woody shrubs; flowers yellowish ⁴*Nicotiana*
Herbs; flowers white to purplish 9
9. Corolla tube c. 1mm wide from base to mouth, then abruptly expanded into limb 7. *Nierembergia*
Corolla tube more than 1mm wide, gradually widening from base upwards 10
10. Calyx lobes fused for c. half their length from base with translucent intersepal membranes;
capsule opening from apex into 4, rarely 2 valves ⁴*Nicotiana*
Calyx lobes free more or less to base, lacking intersepal membranes; capsule opening from
apex into 2 entire or very shortly bifid valves 9. *Petunia*
11. Anthers with sterile terminal appendages; leaves deeply pinnatisect 6. *Lycopersicon*
Anthers entire, lacking appendages; leaves entire or lobed 12
12. Calyx enlarged in fruit, becoming longer than berry and enclosing it 13
Calyx not or scarcely enlarged in fruit, always shorter than berry 17
13. Mature berry red or black 14
Mature berry not red or black 15
14. Berry shining black; flowers purple-brown, more than 15mm long ⁵*Atropa*
Berry bright red; flowers greenish-yellow, less than 10mm long 11. *Withania*
15. Fruiting calyx lobes much longer than tube, auriculate at base; flowers blue ⁶*Nicandra*
Fruiting calyx lobes much shorter than tube, not auriculate; flowers purple or yellowish 16
16. Flowers in extra-axillary cymes, purple, fruiting calyx more or less globular, never ribbed ¹*Solanum*
Flowers solitary in leaf and stem axils, yellow, sometimes with dark markings; fruiting calyx
not globular, often ribbed 8. *Physalis*
17. Corolla stellate, lobes equal to tube 2. *Capsicum*
Corolla tubular, funnel-shaped or urn-shaped, lobes much shorter than tube 18
18. Spinescent shrubs with more or less fleshy leaves; flowers in axillary clusters; corolla
funnel-shaped. ²*Lycium*
Non-spinescent shrub or climber, leaves not fleshy; flowers solitary in axils, or in leafy
sometimes congested panicles or racemes; corolla urn-shaped or tubular 19
19. Corolla urn-shaped; flowers solitary in axils; scrambling climber 10. *Salpichroa*
Corolla tubular; flowers in panicles or racemes; erect shrubs or small trees 3. *Cestrum*

1. BROWALLIA L.

L., Sp. Pl. (1753) 631; Gen. Pl. (1754) 278.

Erect, branching *herbs* to 1m (usually less). Pubescent with simple and glandular hairs. *Leaves* petiolate, simple, entire, sometimes geminate. *Flowers* solitary, axillary, *calyx* tubular, lobed, the lobes sometimes sub-foliose, exceeding the capsule. *Corolla* salverform, zygomorphic, the tube swollen at the apex, the mouth of the tube contracted, the *stamens* usually 4, a staminode or fifth anther sometimes present, didynamous. *Ovary* 2-loculed, ovules numerous, stigma expanded. *Fruit* a 2-valved capsule. *Seeds* numerous, minute.

A small genus of few species native to tropical America. One species *B. americana* L. is very variable and widespread. Originally cultivated as an ornamental annual, it is now naturalised in the Old World tropics. For consideration of the array of closely related genera and for the many synonyms for this species see D'Arcy (1973).

1. *B. americana* L., Sp. Pl. (1753) 631.

Type Citation: "Habitat in America australi"

Type Material: Not seen; D'Arcy (1973) gives "Hort. Cliff. BM, the original seed source was Panama".

¹To be published by Symon (1981, in press).

³See Haegi (1976a).

⁵See note in Introduction.

²See Haegi (1976b)

⁴See Horton (1981).

⁶See Horton (1979).

A very variable, erect *herb* to 1m, though usually less. Sparsely or densely pubescent with simple multicellular hairs, unarmed. *Leaves* to 7 x 5cm, more often c. 3.5 x 2 cm, ovate, apex acute to acuminate, base rounded, upper leaves often smaller and narrower. *Petiole* 5-10mm long. *Pedicels* erect, in the upper leaf axils. *Calyx* 10-12mm long, 4-5 partite, strongly angled, the lobe $\frac{1}{4}$ - $\frac{1}{3}$ of the total length. *Corolla* tube 1.5-2cm long, swollen on one side in the region of the anthers, the limb salverform, 10-15mm diam., shallowly lobed, shades of purple-blue or white, if coloured often with a contrasting pale centre. *Filaments* 4, didynamous, the upper pair very short, broad, attached to the rim of the tube, curved over so the broad filament substantially blocks the orifice of the corolla tube, the anther cells unequal, the upper reduced, the lower filaments attached further down, their apices inverted, the anthers with equal cells, style simple, the stigma flattened, elaborated and placed between the two sets of anthers. *Fruit* an erect capsule enclosed within the calyx. *Seeds* 0.75-1mm long, prismatic, minutely reticulate, numerous.

Note

The genus was first recorded as naturalised in Australia by White (1936) where it was described as a weed which is hard to eliminate. However, no other collections seem to have been made. White (1936) gives the extra information "Armstrong Creek near Dayboro; August 1934", but this is not on the surviving herbarium sheet. It was not possible to dissect the flowers of the single collection cited below.

Representative specimen

QUEENSLAND: *Mead s.n.*, s.d., Dayborough, becoming a pest in paddocks (BRI).

2. CAPSICUM L.

L., Sp. Pl. (1753) 188; Gen. Pl. (1754) 86.

Erect or spreading *herbs* or short-lived soft-wooded shrubs. Glabrous or sparsely pubescent with simple hairs. *Leaves* simple mostly entire, ovate or elliptic often geminate. Inflorescence of 1 or few pedicellate flowers from the leaf axil, often decurved at anthesis and erect in fruit. *Flowers* 5-partite. *Calyx* shortly tubular, truncate, the lobes short or reduced to marginal teeth or absent. *Corolla* deeply or broadly stellate, white or pale bluish, stamens equal, filaments inserted at the base of the corolla tube, *anthers* yellow or purplish, dehiscing by slits. *Ovary* 2-loculed, numerous ovules, style erect; stigma capitate. *Fruit* a dryish or sub-fleshy berry, mostly bright orange-red when ripe (less often purple, yellow or white). *Seeds* flattened, yellow or pale buff in colour.

A small genus of about 10-12 species originally from tropical America. Several species are very widely grown as chili, pepper, cayenne pepper, as a vegetable or pungent condiment. The numerous cultivars have received many names and only in recent times has the taxonomy approached stability. There is an extensive literature and still some disagreement on the application of names. For an earlier account of the cultivated peppers see Heiser & Smith (1953), for later accounts see Pickersgill (1971) and D'Arcy & Eshbaugh (1974).

The two species described here are closely related morphologically. D'Arcy (1973) states that herbarium specimens of *C. annuum* and *C. frutescens* may be indistinguishable. However, both species are consistently maintained by all recent workers on the genus and it is reported that their interfertility is low.

Key to *Capsicum* species

Adapted from D'Arcy (1973) and Gentry (1974)

1. Pedicels, two or more per node, after first flowering, rarely less, corolla white or greenish white, fruit ellipsoid-lanceolate or lanceolate 2. *C. frutescens*

- Pedicels, mostly one per node, after first flowering, rarely more, corolla white or bluish white,
fruit globose, ovoid or oblong-conical 2
2. Fruits large, mostly more than 1cm across (cultivated peppers)..... 1a. *C. annuum* var. *annuum*
Fruits small, less than 1cm across, mostly spontaneous forms 1b. *C. annuum* var. *glabriusculum*

1. ***C. annuum* L.**, Sp. Pl. (1753) 188.

Type Citation: "Habitat in America meridionali.Ø"

Type Material: Not seen.

Solanum shanesii F. Muell., Fragm. 6 (1868) 144.

Type Citation: "Ad rivulos montium prope Rockhampton; Dallachy & O'Shanesy".

Type Material: "P. O'Shanesy 25.ii.1868, No.6 series 1, *Solanum* erect and slender 6-8 feet bark light coloured and slightly blistered, berry shining red $\frac{1}{2}$ " diameter, 2-celled, rare, not prickly, Rockh." (MEL 12404).
Lectotype proposed here. *Dallachy* 435, 17 March 1865, fruit red, Rockhampton (MEL, K).

1a. ***C. annuum* var. *annuum***

Common Name: green pepper; red pepper; cayenne pepper; chili.

Annual or short lived *herb* to 1(-2)m, stems striate, glabrous or sparsely pubescent with simple hairs on young growth, in the leaf axils and at vein junctions below. *Leaves* to 10 x 5 cm, more often c. 6 x 3 cm, smaller on aged and distal twigs, ovate to broad lanceolate, acute to acuminate, base subcuneate, oblique, *petiole* 1-3cm long, narrowly winged above. *Flowers* solitary in leaf axil and stem forks. *Pedicel* 1-1.5cm long. *Calyx* 3-4mm long, cupular, truncate, lobes minute. *Corolla* c. 1.5 cm diam., deeply stellate, the lobes triangular, white. *Filaments* c. 2mm long. *Anthers* 2-2.5 mm long, oblong, opening by slits, bluish. *Ovary* 2-2.5 mm long, ovate. *Style* c. 2mm long, erect; *stigma* small, terminal. Fruit an erect or pendant *berry*, ovoid varying greatly in size in horticultural cultivars, but usually greater than 1.5-2cm wide and long, at first ivory, then flushed purplish, finally bright red, sweet or pungent. *Seeds* 3-4mm long, flattened, yellowish.

Distribution

Widely cultivated as a crop and ornamental and occasionally persisting.

Notes

This description is based substantially on the form commonly grown in gardens as an ornamental and occasionally found spontaneous. Cultivars of the edible horticultural forms vary greatly in fruit shape and colour. They are frequently gross in size and flowers may be 5-7 partite. Peppers are very widely cultivated in temperate and tropical areas (e.g. Jessup, 1964).

Solanum shanesii F. Muell. is tentatively placed in synonymy here. It may be an early escape from cultivation particularly as the pedicels are reflexed, the berry globular and of moderate size. Almost all recent collections of naturalised *Capsicum* have erect fruits that are less than 1 cm diam., although they may be globular or ellipsoid. The syntype at K has been labelled *C. frutescens*, but the solitary pedicels would seem to exclude that species. A later collection (MEL 12402) has the label "O'Shanesy 1.ii.1869 Rockhampton. A deciduous shrub, flowers blue, petals reflexed, anthers yellow", which sounds more like a *Solanum* than a *Capsicum*. *S. shanesii* may represent the early stages of naturalisation.

Representative specimen

SOUTH AUSTRALIA: *Symon* 11570, 2.v.1979. Tasmore, Adelaide. Fruits at first ivory, then flushed purple, finally red (ADW, MO).

1b. *C. annuum* var. *glabriusculum* (Dunal) Heiser & Pickersgill, *Baileya* 19 (1975) 151-156.

C. hispidum var. *glabriusculum* Dunal in DC., *Prodr.* 13 (1852) 420. *Basionym.*

Type Citation: "♂ In Mexico circa Bejar (Berland. n. 1863 in h. Moric.); circa Tampico de Tamanlipas (Berl., n. 95 in h. Moric.)"

Type Material: Not seen. For discussion of the complex nomenclature involved see Heiser & Pickersgill (1975) and D'Arcy & Eshbaugh (1974).

Capsicum frutescens var. *queenslandicum* Domin. *Bibl. Bot.* 89 (1928) 1126.

Type Citation: "Nordost-Queensland: Regenwalder bei Harveys Creek (Domin. 1. 1910)"

Type Material: Not seen. Possibly at Prague.

Common Name: bird pepper.

An erect or sprawling short-lived *shrub* to 2m tall, stem somewhat ribbed, distal branches often widely forked. Glabrous except for minute appressed simple hairs on young growths and some long hairs on the veins below and tufts at the vein junctions. *Leaves* to 12 x 5cm but commonly about 6 x 3.5cm, further reduced on older distal twigs, ovate, entire, apex acute to acuminate, base rounded to cuneate, usually oblique, *petiole* 1-4cm long, often narrowly winged above. *Inflorescence* a solitary (rarely two) pedicellate flower from the leaf axil or stem fork. *Pedicel* 1.5-2 cm long. *Calyx* 2-3mm long, cupulate, truncate, the lobes minute. *Corolla* c. 1.5cm diam., deeply stellate the lobes triangular, white; *filaments* c. 1mm long; *anthers* c. 2.5mm long, oblong, opening by slits, bluish; *ovary* 2.5mm long, bluntly conical; style 4mm long, erect; stigma small, terminal. Fruiting pedicel 2-3.5cm long stiffly erect, slightly swollen above; calyx scarcely enlarged; *berry* 1-2.5cm long, from globose, ovoid to oblong-conical, less than 1cm diam., bright orange-red, extremely pungent. *Seeds* c. 4mm long, flattened, sometimes twisted, hilum prominent, about 20 seeds.

Distribution

Queensland, along the coast. Map 3.

Selected specimens (all cited)

NORTHERN TERRITORY: *Symon 8000*, 30.vi.1972, Darwin, in domestic garden. Growing up through shrubs to 2 m (ADW).

QUEENSLAND: *Griffiths s.n.*, Oct. 1887, Mackay (BRI); *Michael 887*, s.d., Mt Julian nr Proserpine (BRI); *Rodway Q4*, 24.xi.1927, North West Island, Capricorn Is. (NSW); *White 8836*, 26.iii.1933, Clevedon nr Townsville (BRI); *Brass & White 196*, 17.ix.1937, Daintree (BRI); *Everist 5078*, 16.v.1952, 14 miles N of Cardwell (BRI); *Symon 4746*, 17.v.1967, nr Redlynch on road to Mareeba (ADW, BRI, CANB); *Symon 4878*, 25.v.1967, Irvine Bank (ADW, BRI, CANB, K); *Baxter 1074*, Aug. 1968, North West Island (Pt Curtis dist.) (BRI); *Telford 968*, 27.v.1969, Coalstown Lakes, 25 miles E of Gayndah (ADW, CBG); *Lebler & Durrington 33*, 22.i.1970, junction of Barambak Creek and Burnett River, 5 miles NE of Gayndah (BRI); *Blake 23448*, 21.v.1970, Jansen Crossing, Endeavour R., SW of Cooktown (BRI, NSW); *Sharpe & Dowling 2287*, 27.iv.1977, Littabella Crk, 12 km N of Yandoran (30 km N of Bundaberg) (BRI).

NEW SOUTH WALES: *Powell s.n.*, May 1974, Gunnedah (NSW).

2. *C. frutescens* L., *Sp. Pl.* (1753) 189.

Type Citation: "Habitat in India."

Type Material: Not seen.

Common Name: bird pepper.

Herb or *subshrub* to 2m tall, sometimes woody below. Glabrous except for minute simple hairs on young points and in leaf axils. *Leaves* to 10 x 5cm, usually somewhat less particularly on distal shoots, ovate-lanceolate, apex acuminate, base subcuneate, often oblique. *Petiole* 1-3cm long. Flowers several, pedicellate from the leaf axil. *Pedicel*

1-1.5cm long. *Calyx* 2-3mm long, cupulate, truncate, lobes minute or absent. *Corolla* c. 8mm long, stellate, lobes triangular. *Filaments* c. 1mm long. *Anthers* 1.5-2mm long, oblong, opening by slits. *Ovary* 1.5-2mm long, bluntly conical. *Style* 3-4mm long, erect, slightly exceeding the anther; *stigma* small, terminal. Fruit an erect *berry* 1-1.5cm long, c. 5mm diam. narrow conical, fusiform or ellipsoidal, red, pungent. *Seeds* c. 4mm long, flattened, with slightly thickened margin, yellowish.

Distribution

Queensland, along the coast. Map 3.

Selected specimens

QUEENSLAND: *Nilsson s.n.*, Apl 1920, Kinguni via Mirani (BRI); *Seddon s.n.*, Apl 1932, Cudgen, Murwillumbah (NSW); *Johnson s.n.*, 26.v.1951, Buderim Mntn (NSW); *Speck 1735*, 24.viii.1963, 6 km N of Toorilla Hmstd, Pt Curtis (CANB, NSW); *Jones 3595*, July 1967, Mt Dryander, Proserpine (CANB).

3. CESTRUM L.

L., *Sp. Pl.* (1753) 191; *Gen. Pl.* (1754) 88.

Woody *shrubs* or small *trees*. Glabrous or with simple or dendritic hairs. *Leaves* simple, entire, petiolate, sometimes geminate. *Inflorescence* axillary or terminal often a congested raceme or panicle. *Corolla* tubular, sometimes slightly zygomorphic, tube obconic or slightly inflated, lobes short. *Stamens* 5 mostly sub-equal, filaments inserted on corolla tube, variously pubescent, anthers included. *Ovary* on a small disc, glabrous, 2-loculed; *stigma* capitate, about the level of the anthers. *Fruit* a succulent berry. *Seeds* prismatic, embryo straight or curved in the endosperm.

A large genus with many species in both Central and South America, several of which have been widely cultivated as ornamentals. There has been no more recent monograph than that by Francey (1935-36), but three recent regional accounts deal with numbers of species: viz. MacBride (1962) 42 species; D'Arcy (1973) 20 species; Gentry (1974) 25 species. Bailey (1913) reported *C. nocturnum* L. to be naturalised in Queensland. It may have been a misidentification of *C. parqui* L'Herit. The following are also cultivated: *C. diurnum* L., *C. newellii* (Veitch) Nicholson, *C. psittacinum* Stapf, and *C. cultum* Francey, an apparent hybrid between *C. elegans* and *C. parqui*.

Key to *Cestrum* species

1. Flowers reddish; plants softly pubescent (densely so in region of inflorescence);
ripe berry red 2. *C. elegans*
Flowers greenish-yellow to orange; leaves only sparsely pubescent or glabrescent; berry
black or white 2
2. Corolla orange-yellow; ripe berry white 1. *C. aurantiacum*
Corolla greenish-yellow; berry black or white 3
3. Corolla tube 2-3mm wide below the lobes; filaments with an erect process;
ripe berry white 3. *C. nocturnum*
Corolla tube 3-5mm wide below the lobes; filaments without erect process;
ripe berry black 4. *C. parqui*

1. *C. aurantiacum* Lindl., Bot. Reg. 30 (1844) 71, n.65 and 31 (1845) t.22

Type Citation: "The Horticultural Society raised it from Guatamala seeds communicated by G.V. Skinner, Esq. and it lately flowered (August 1844) in the Chiswick Gardens. Its native place is said to be Chimalapa".

Type Specimens: Not seen.

Common Name: orange cestrum.

Large *shrubs* 3-4 m tall, sprawling, clambering and suckering. Sparsely pubescent on tips and new growth with minute crisped hairs, soon glabrescent. *Leaves* about 7-10 x 3.5-5 cm, elliptic, entire, apex acute to acuminate, base rounded to cuneate. *Petiole*; 1-3 cm long. *Inflorescence* subspicate, racemose, axillary and terminal, of 10-15 flowers often congested towards the apex; most flowers subtended by a bract, leafy below, linear above, vespertine. *Flowers* sessile, *calyx* 5-8 mm long, tubular, calyx lobes 1-3 mm long, linear, the margin between the lobes ciliate, *corolla* tube 17-20 mm long, very slightly inflated above, lobes (5-6-7 in specimens to hand) 5 mm long, broadly triangular, inrolled during the day. *Stamens* 5, *filaments* c. 5 mm long, inserted about the middle of the tube and with a bluntly conical pubescent process at that position, sparsely and minutely pubescent below, slightly incurved just below the stigma; *anthers* 1.5 mm long before anthesis. *Ovary* glabrous, surrounded by a fleshy disc below, *style* 15-16 mm long, *stigma* 1-1.25 mm diam. capitate, dark green, slightly exceeding the anthers, included. Mature *fruit* reported 8-12 mm long, white, not seen.

Distribution

South eastern Queensland and coastal New South Wales. Map 1.

Note

C. aurantiacum is grown as a garden shrub and Maiden (1895) and Edgar (1933) reported it toxic to stock when animals were fed garden clippings. Beadle, Evans & Carolin (1972) report it naturalised about the Sydney region where it is proving difficult to control.

Specimens examined (all cited)

QUEENSLAND: *Hack s.n.*, 5.ii.1951, 'Roslyn', North Tamborine (BRI); *Wilcox s.n.*, 15.vi.1959, 'Logie', Tamborine (BRI); *Wood s.n.*, 7.vi.1963, West Cliff Rd, Tamborine (BRI); *Anon s.n.*, 17.ix.1951, Tamborine (BRI).

NEW SOUTH WALES: *Whittingham s.n.*, July 1912, Rydalmere (NSW); *Moylan s.n.*, May 1920, Greenwich (cult.) (NSW); *Glenfield Vet. Res. Stn s.n.*, 17.v.1933, Nowra (NSW); *Glenfield Vet. Res. Stn s.n.*, 20.xi.1937, Lismore (NSW); *Glenfield Vet. Res. Stn s.n.*, 16.v.1952, Gerringong (NSW); *Smith s.n.*, 18.v.1952, Gerringong (NSW); *McGuire s.n.*, 7.vii.1952, 29.vii.1952, Kurrajong North (NSW); *Constable s.n.*, 2.v.1957, Upper Cordeaux Dam (NSW); *Lambkin s.n.*, 24.vii.1972, Dumaresque Isl., nr Taree (NSW).

2. *C. elegans* (Brongn. ex Neumann) Schlecht., *Linnaea* 19 (1847) 261.

Habrothamnus elegans Brongn. ex Neumann, *Annales de Flore et de Pomone* Jan. (1844) 118. *Basionym*.

Type Citation: Not seen.

A woody *shrub* 2-3 m tall. Pubescent with simple, forked and dendritic hairs which are dense and purple in the region of the inflorescence. *Leaves* alternate, to 17 x 9 cm, commonly about 9 x 4.5 cm, broad lanceolate, entire, acuminate, base rounded, principal veins impressed above, conspicuous below; *petiole* 1-3 cm long, grooved above. *Inflorescence* a congested terminal panicle of subspicate racemes, one to three racemes from each leaf axil, lower flowers subtended by bracts. Bract 3-7 mm long, lanceolate, often coloured. *Pedicel* 0.5 mm long, or absent. *Calyx* tube c. 5 mm long, lobes c. 3 mm long, triangular acuminate. *Corolla* tube 2 cm long, c. 1.5 mm diam. at the base, 5 mm diam. just below the lobes, glabrous; lobes c. 4 mm long, long triangular, pubescent, strongly reflexed, close to *Spiraea* Red R.H.S. 025/1. *Filaments* 1 cm long, attached just below middle of tube, swollen, sparsely retrorsely pubescent above point of attachment, inflexed at summit; *anthers* 1-1.5 mm long, minutely papillose. *Ovary* 1.5 mm diam., glabrous, pink above, surrounded below by yellowish annular disc. *Style* c. 17 mm long, erect, minutely papillose above, *stigma* capitate, yellowish green, included but exceeding the anthers. *Berry* to about 1 cm diam. (but few seen), \pm globular, succulent, red.

Distribution

South eastern Queensland and southern Victoria. Map 1.

Specimens examined (all cited)

QUEENSLAND: *Jessup 121*, 9.vi.1978, Mt Glorious (BRI); *Everist, Teys & Knowles s.n.*, 4.vii.1962, Tamborine (BRI).

VICTORIA: *Kenny s.n.*, 1919, Williamstown (BRI); *Opie s.n.*, Apl 1977, Perrins Crk Rd, nr Beagley's Bridge (MEL).

3. *C. nocturnum* L., Sp. Pl. (1753) 191.

Type Citation: "Habitat in Jamaica, Chilli \bar{h} ".

Type Material: Not seen. D'Arcy (1973) cites Hort. Cliff. (BM).

Common Name: lady of the night.

Large *shrub* or small tree 2-4m tall, branches somewhat flexuose. Sparsely pubescent with crisped simple hairs mainly on young twigs and midribs of leaves below, minute glandular hairs also occur. *Leaves* to 15 x 7 cm, commonly c. 10 x 4 cm, alternate, lanceolate-elliptic, base rounded or broadly cuneate, apex acuminate. *Petiole* 5-10 mm long. *Inflorescence* of spike-like racemes, often congested, forming terminal leafy panicles. *Peduncles* to 9 cm long, mostly less. *Pedicels* to 3 mm long, upper flowers sessile, with reduced leafy or linear bracts 3-10 mm long. *Calyx* c. 2.5 mm long, campanulate, divided one third of the length into triangular lobes, all minutely puberulent. *Corolla* slender, slightly enlarged upwards, the lobes c. 4 mm long, inrolled during the day, vespertine, strongly scented at night, greenish yellow. *Filaments* c. 3 mm long, inserted high up the corolla tube, an erect process, sometimes bifid, projecting just below the point of insertion, the apex slightly incurved, the filaments minutely retrorsely pubescent where adnate to the tube. *Anthers* 0.5 mm long. *Ovary* with annular disc. *Style* 15-16 mm long, simple. *Stigma* shortly bifid exceeding the anthers. Fruit a *berry* 8-10 mm diam. hard or juicy, white. *Seeds* c. 4 mm long, somewhat flattened, prismatic, the outer face convex, the inner faces concave, the hilum scar oval, almost central, minutely reticulate.

Distribution

Sparingly naturalised in N.S.W. near East Maitland.

Note

This species is native to the Antilles and Central America and is widely cultivated throughout the tropics for its strongly night scented flowers. Maiden (1904) and Hindmarsh (1937) recorded *C. nocturnum* as poisonous to stock but this may have been a misidentification of *C. parqui*.

Selected specimen

NEW SOUTH WALES: *Lynch s.n.*, 5.ii.1974, East Maitland. Apparently native, scattered in back yards, etc. to 1-1.5 m high in large clump, flowers yellow (NSW).

4. *C. parqui* L'Herit., Stirp. Nov. fasc. 4 (1788) 73, t. 36.

Type Citation: Not seen.

Type Material: Not seen.

Common Name: green poison berry; Chilean cestrum; green cestrum.

Woody *shrub* to 2-5 m tall, suckering. Minutely pubescent with simple and short glandular hairs on new shoots and in leaf axils, glabrescent, hairs more abundant on corolla lobes. *Leaves* alternate, (2-)3.5-5(-6.5)cm, lanceolate, entire, apex acute to acuminate, base cuneate, tapering to the petiole, malodorous; *petiole* c. 1 cm long.

Inflorescence a congested terminal panicle of numerous flowers, lower flowers may have linear bracts. *Pedice*l 0.5 mm long or absent. *Calyx* c. 5 mm long, tubular, the lobes c. 1 mm long, triangular. *Corolla* tube c. 16 mm long, cylindrical, slightly expanded upwards, lobes c. 5 mm long, broadly triangular, pubescent on margins which are inrolled by day, greenish yellow, sweet scented, vespertine. *Filaments* c. 7 mm long, subequal, attached near middle of the tube, swollen and retrorsely pubescent in lower part; *anthers* c. 1 mm long, included. *Ovary* 1 mm diam. globular on a small annular disc, *style* 17-18 mm long, slender, *stigma* capitate. *Berry* 1-1.5 cm long, oval-ovate, shining, succulent, black. *Seeds* 3.5-4 mm long, prismatic, dark brown, about 10 per berry.

Distribution

In Queensland mainly in the south east, in New South Wales mainly along the coast, in eastern Victoria and the higher rainfall areas of South Australia. Map 2.

Note

C. parqui is toxic to cattle, sheep, horses and poultry, Rudd & White (1933), Lavers (1953), Everist (1974), Kleinschmidt & Johnson (1980). It is cultivated as a shrub, is spontaneous in suburban gardens (Adelaide) and is extensively naturalised. An extended account of this species in Victoria including map and illustration is given by Parsons (1973).

Specimens examined

NORTHERN TERRITORY: *Lendon s.n.*, 2.i.1976, Alice Springs, private garden (NT).

QUEENSLAND (selection of 35 examined): *Hubbard 2864*, 1.vi.1930, Kangaroo Point, Brisbane (BRI); *Beasley 88*, Mch 1934, Chinchilla (BRI); *Clemens s.n.*, Nov. 1945, Charleville (BRI); *Everist 3157*, 8.ix.1947, Lawes, 80 km W of Brisbane (BRI); *Webb 5212*, Oct. 1950, Brisbane (CANB); *Rawson s.n.*, 29.iii.1957, Blackbutt (BRI); *Quinn s.n.*, 16.v.1957, Mulgildie (BRI); *Klose s.n.*, 20.vi.1958, Toowoomba (BRI); *Marshall s.n.*, 14.iii.1961, Beechmont Mntn (BRI); *Lambley s.n.*, 18.iv.1961, Miles (BRI); *Everist s.n.*, 28.ix.1961, Wooroolin (BRI); *Diatloff s.n.*, 16.xi.1961, Boyland, nr Canungra (BRI); *Gillieatt bl*, 14.iv.1963, Mt Coot-tha, nr Bardon (BRI); *McDougall s.n.*, 4.x.1963, Kooralgin, Cooyar (BRI); *Gillieatt s.n.*, 15.vi.1964, Tech. Coll., Brisbane (BRI, CANB, MEL); *Holmes s.n.*, 9.i.1969, Dalby (BRI); *Lincoln s.n.*, 16.ii.1972, Roma (BRI).

NEW SOUTH WALES (selection of 20 examined): *Hindmarsh s.n.*, 10.x.1936, Grafton (NSW); *Bailey s.n.*, Mch 1939, Murwillumbah dist. (NSW); *Glenfield Vet. Res. Sin s.n.*, 20.i.1944, Albury (NSW); *Chopping s.n.*, Mch 1949, Balmain (NSW); *Arthur s.n.*, July 1950, Lismore (NSW); *Mactier s.n.*, 9.iv.1951, Moree (NSW); *Vickery s.n.*, 20.iv.1953, Clarence Riv., nr Lawrence (NSW); *Constable 5962*, 8.vi.1965, Aerodrome Mascot (NSW); *McBarron 15593*, 24.vii.1968, Flemington Saleyards (NSW); *Rodd 2276*, 12.xi.1972, Barranjoey (NSW); *Mansfield s.n.*, 20.xi.1974, Midkin South, Moree (NSW); *Waterhouse s.n.*, 13.v.1975, Nara Glen (NSW); *Barry 7*, 8.vi.1975, Barranjoey (NSW); *Burn s.n.*, 17.vi.1975, Maitland (NSW); *Pickard 3488*, 27.v.1977, 1 km SW of Minamurra (NSW).

VICTORIA: *Anon s.n.*, Apl 1940, King River Valley, Whitfield (MEL); *Cameron 7424*, 3.xii.1976, Iguana Creek Gorge, 1 km N of town of Iguana Creek (MEL).

SOUTH AUSTRALIA (mostly spontaneous in old gardens and waste places): *Dept Agric. s.n.*, 6.i.1939, Adelaide, Prospect (ADW); *Symon s.n.*, 25.v.1957, Adelaide, Ferryden Park, naturalised along conduits and drains of sewerage farm (ADW); *Clarke s.n.*, 1958, Mundulla via Bordertown (ADW); *Kain 130*, Oct. 1961, Spalding (ADW); *Symon 8452*, 21.i.1973, Kangaroo Island, abandoned garden, Hog Bay River farm (AD, ADW, CANB); *Symon 8814*, 16.v.1974, Burra, Paxton Square (ADW, B, CANB, K, MO).

4. CYPHOMANDRA Mart. ex Sendt.

Sendt., Flora 28 (1845) 161-176.

Trees, shrubs and vines, unarmed. Pubescent with simple, glandular or dendritic hairs. *Leaves* simple or compound, entire or lobed, often foetid, very variable within the genus, petiolate. *Inflorescence* of simple or branched racemose cymes often from a stem dichotomy. *Flowers* mostly 5-partite, *corolla* mostly deeply lobed, *filaments* free or connate extending into an elaborate connective at the back of the anther (one of the few distinctive features of the genus), anthers opening by pores or with longitudinal slits. *Ovary* with many ovules. *Fruit* a succulent berry. *Seeds* flattened, embryo circinnate.

An ill-defined genus of about 40 species badly in need of revision (Hunziker, 1979). The species are largely confined to the tropical mountainous regions of South America.

1. *C. betacea* (Cav.) Sendt., Flora 28 (1845) 172, pl. 6.

Solanum betaceum Cav., Icon, 6 (1800) 15, t. 524. *Basionym*.

Type Citation: "Habitat . . . h. Floret et fructificat in Regis horto Matritensi Julis et Augusto".

Type Material: Not seen, possibly MA.

Common Name: tree tomato; tamarillo.

A small *tree*, branching above, pubescent with minute simple hairs mixed with short glandular hairs, malodorous, clammy. Lower and juvenile *leaves* to 35 x 30 cm, commonly c. 15 x 12 cm, ovate, entire, apex acute to shortly acuminate, base cordate, basal lobes often overlapping. *Petiole* 5-15 cm long, terete. *Inflorescence* a pendulous cyme from stem fork or leaf axil. *Pedice*l 1-2 cm long. *Calyx* c. 5 mm long including the broad rounded lobes, densely glandular pubescent. *Corolla* c. 2 cm diam., deeply stellate, lobes cut almost to base, somewhat fleshy, pink, scented. *Filaments* c. 2 mm long, attached to base of corolla tube. *Anthers* 4-5 mm long, stout, erect, connective broad and thick along the back of the anther. *Ovary* bluntly conical. *Style* 5-6 mm long, stout, erect. *Stigma* not expanded at the apex. Fruit a succulent *berry*, 5-7 cm long, ovoid, dull dark red. *Seed* 3.5-4 mm diam., discoidal, the surface hirsute if not vigorously cleaned, shallowly reticulate-foveate, margin with a narrow wing, 0.25 mm wide, pale reddish brown, numerous.

Notes

The name *C. crassifolia* (Ortega) Kuntze, Revis. Gen. Pl. 3 (1898) 220, is used by McBride (1962, p. 12), Heiser (1969, p. 111) and *C. crassicaulis* (Ortega) Kuntze by D'Arcy (1973, p. 616), probably an orthographic error, are both based on *Solanum crassifolium* Ortega, Hort. Matr. Dec. 9 (1800) 117, which is a later homonym of *S. crassifolium* Salisb. (1796) and *S. crassifolium* Lam. (1797) and is thus illegitimate. The details are discussed by Sandwith (1938, p. 225). Several species have edible fruit and the one described here is now widely grown in warm temperate and upland tropical areas as a fruit. It is grown in all States in Australia with commercial plantings only in subtropical sites. For culture in New South Wales see Slack (1976).

Specimens examined (all cited)

QUEENSLAND: *Keys s.n.*, s.d., Blackall Range, naturalised (leaves only) (BRI); *Blake 1962*, 24.ix.1954, Mt Mobullan, Bunya Mntns, 1080 m, in rain forest (2 sheets) (BRI); *Douglas s.n.*, 16.viii.1956, Mooloo, S of Gympie in banana plantation (leaves only) (BRI); *Rudder 4081*, 26.ii.1965, State Forest Reserve 194, North Kennedy district (leaf only) (BRI).

NEW SOUTH WALES: *Clark, Picard & Coveny 1714*, 24.vii.1969, Yabbra State Forest, about 8 km S of Urbenville. (Leaves only, not seen) (NSW).

5. HYOSCYAMUS L.

L., Sp. Pl. (1753) 179-180.

Annual, biennial or perennial *herbs*, often viscid. *Leaves* alternate, often lobed. *Flowers* axillary in bracteate spikes or racemes. *Calyx* campanulate-tubular, 5-toothed, accrescent. *Corolla* broadly infundibuliform with 5 blunt lobes. *Stamens* inserted near base of corolla and \pm exserted. *Fruit* a capsule within the calyx, circumscissile. *Seeds* reniform to orbicular.

A genus of about 20 species distributed from Europe and North Africa to Central Asia. One species *H. niger* L. is cultivated as a source of the alkaloids hyoscyamine, scopolamine, and hyoscyne, see Hocking, *Econ. Bot.* 1 (1947).

Key to *Hyoscyamus* species

1. Cauline leaves sessile; corolla pale yellow with purple veins 1. *H. niger*
 Cauline leaves petiolate; corolla yellowish-white 2. *H. albus*

1. *H. niger* L., Sp. Pl. (1753) 179.

Type Citation: "Habitat in Europae ruderatis pinguibus".

Type Material: Not seen.

Common Name: black henbane.

A viscid foetid *annual* or *biennial* to c. 50 cm tall, erect or sparsely branched below. Stems, lower petiole, calyx base pubescent with long, simple, often glandular almost arachnose hairs, sparse and shorter elsewhere, leaf margin \pm ciliate. *Leaves* variable, lower leaves to 13 x 8 cm, ovate in outline, 2-4 triangular lobes on each side, apex acute, base sub-cuneate, *petiole* narrowly winged with decurrent lines on the stem, upper leaves smaller, more or less sessile and amplexicaule, leaves subtending the flowers entire, or with 1-2 lobes, somewhat narrower. Flowers subsessile in a dense unilateral spike each subtended by a leafy bract. *Calyx* at anthesis c. 1 cm long, tubular, with triangular lobes, apex acute. *Corolla* 2-3 cm diam. slightly zygomorphic, lobes rounded, pale yellow with conspicuous reticulate veins. *Filaments* attached to tube of corolla, glandular pubescent below, *anthers* 2-3 mm long, oblong, somewhat exerted, *style* curved, exceeding the anthers, *stigma* capitate. Fruiting calyx to 2.5 cm long, broadly urceolate, cartilagenous, veins reticulate, prominent, the lobes \pm divergent, pungent, *capsule* circumscissile. *Seeds* c. 1.5 mm long, sub-reniform, brown, minutely deeply reticulate.

Note

Eardley (1935) recorded this species in South Australia but there have been no recent collections.

Specimens examined (all cited)

NEW SOUTH WALES: *Humphrey s.n.*, Dec. 1906, Glenbrook (NSW); *Ward s.n.*, 22.i.1917, Sydney Bot. Gdn, cult. (NSW).

VICTORIA: The specimen mentioned by Willis (1972), *Willis 559* from near Kyabrum, has not been seen by me.

SOUTH AUSTRALIA: *Hutton s.n.*, May 1935, Jamestown, near stockyards (AD); *Eardley s.n.*, 17.vi.1935, Wolseley (fragment and drawing) (AD).

2. *H. albus* L., Sp. Pl. (1753) 180.

Type Citation: "Habitat in Europa australi".

Type Material: Not seen.

Common Name: white henbane.

Annual, *biennial* or *perennial*, about 50 cm tall, woody below, erect. Densely hirsute-pubescent with simple glandular hairs to 2 mm long particularly on the stems. *Leaves* reported 4-10 x 3-8 cm, orbicular-ovate, obtuse, cuneate to cordate at base, incise-dentate with rounded teeth. *Petiole* 1-5 cm long. Flowers sessile except the lowest, in dense unilateral spikes; bracts leaf-like. *Calyx* 1-1.5 cm long densely glandular-villous, teeth broadly triangular. Fruiting calyx swollen below, hypocrateriform above with short triangular pungent teeth. *Corolla* to 3 cm long, tubular-campanulate, somewhat zygomorphic, usually yellowish-white, throat greenish or purplish. *Stamens* included or slightly exerted.

Due to the inadequate local specimens the description is almost wholly from 'Flora Europaea'. There has been only one recent collection seen and it would seem highly likely that *H. albus* is not established in Australia.

Specimens examined (all cited)

QUEENSLAND: *Martin s.n.*, 13.x.1976, Sherwood, Alan Fletcher Res. Stn in a paddock (BRI).

VICTORIA: *French s.n.*, Oct. 1913, Williamstown (MEL); *McKerral s.n.*, 1882, Leigh River nr Warrambeen Station (leaf and flower only) (MEL).

TASMANIA: *Spicer s.n.*, Dec. 1876, nr Hobart Town (HO).

6. LYCOPERSICON Mill.

Mill., Gard. Dict. abr. ed. (1754).

Perennial sprawling *herbs* sometimes subwoody towards the base. Pubescent with simple or glandular several-celled hairs and abundant usually shorter glandular hairs, unarmed, aromatic. *Leaves* pinnately lobed or divided, smaller interstitial leaflets often present, leaflets sessile or stalked, entire or lobed. *Inflorescence* lateral, a several flowered racemose cyme or subpaniculate, pedicels articulate in the upper half. *Calyx* deeply divided, lobes lanceolate. *Corolla* 5-partite (6-9 in cultivars) stellate, yellow, filaments short, *anthers* erect, cohering in a tube about the style, dehiscing introrsely by longitudinal slits, each anther with sterile, conical terminal appendage. *Ovary* 2-loculed, with enlarged placenta (multi-locular in cultivars). Fruit a *berry* generally red. *Seeds* compressed, pilose, embryo coiled.

A small genus centred on the Pacific coast of western South America (Chile to Colombia) and extending to the Galapagos Islands. The ten or so species are closely related to the genus *Solanum*.

1. *L. esculentum* Mill., Gard. Dict. ed. 8 (1768).

Type Material: Not seen.

Solanum lycopersicum L., Sp. Pl. (1753) 185; Domin, Bibl. Bot. 89 (1928) 1126.

Common Name: tomato.

Sprawling short lived *herb* 50-150 cm tall. Often densely pubescent with simple and glandular hairs, clammy, aromatic. *Leaves* to 30 x 20 cm, ovate in outline but deeply pinnatisect into 7-9 major lobes which are petiolulate, the lobes themselves entire or with petiolulate or sessile lobes, sessile or petiolulate interstitial leaflets also occur along the leaf midrib, leaflet apices acute to acuminate, base oblique, often sub-cordate. *Petiole* 2-5 cm long. *Inflorescence* lateral, a racemose cyme sometimes forked, of few to many flowers. *Pedicel* articulate in the upper half. *Calyx* deeply divided, the lobes c. 1 cm long narrow lanceolate. *Corolla* 2-2.5 cm diam., stellate, lobes narrow triangular, often reflexed, often 6-9 partite in cultivars, yellow. *Filaments* sparsely pubescent on the margin. *Anthers* 8-10 mm long including the sterile apex 2-3 mm long, lanceolate, cohering in a cone, pubescent within and united by marginal hairs, introrsely dehiscent by slits. *Ovary* glabrous or pubescent. *Style* erect; *stigma* terminal, included. Fruit a succulent *berry*, usually red, globular or depressed globular 1-2 cm diam. in naturalised forms, 5-10 cm diam. smooth or furrowed in cultivars. *Seeds* numerous, 2-3 mm long, compressed, pilose (with ruptured cell walls) drab buff-grey.

Distribution

Warm temperate areas of eastern Australia and sometimes near picnic grounds and campsites.

Notes

Not all authors retain *Lycopersicon* as a separate genus, McBride (1962, p. 158), Seithe (1962, p. 294), Heine (1976, p. 141). Neither of the monographers of the genus, Muller (1940) and Luckwill (1943), discuss the generic separation at any length. The only character separating *Lycopersicon* from *Solanum* is that the anthers open by slits into

the cone formed by the coherent anthers which have elongated sterile tips. "This character distinguishes the genus from *Solanum*" Muller (1940); "The basic character separating the genus from *Solanum*" Luckwill (1943). Most species of *Solanum* have each anther opening by apical pores, and the anthers may or may not form a cone. In all cases the flowers are pollinated by bees which buzz either the cone of anthers or each anther separately. The modification of the cone of anthers of *Lycopersicon* effectively provides a single apical orifice. It is questionable whether this difference in pollination detail is adequate to separate the species at generic level. Other characters such as pinnate-pinnatisect leaves, densely glandular pubescence, articulate pedicels, yellow flowers and hirsute seeds may be found in species of *Solanum*. Rick (1979, p. 667) argues persuasively for maintaining the genus and demonstrates that its reproductive links with related species of *Solanum* are slender. However if these criteria alone are used to define genera many large genera would be divided in small units of 10-12 species to create an enormous number of poorly separated taxa which would be a doubtful advantage.

However, if there is a utilitarian component in nomenclature, it is convenient to have this crop and its related species in a distinct genus rather than being lost in a welter of *Solanum* names.

The tomato is now a major crop and cultivated either under glass or in the open throughout the world. Hundreds of cultivars exist differing in maturity, leaf form, fruit size, colour and shape. Naturalised in warm temperate areas and often occasional about human habitation, picnic grounds etc., it is well known that seeds survive in human faeces and sewage. For a succinct account of the tomato see Rick (1978). The feral forms appear to revert rapidly to the small fruited wild type and where fruits are present on specimens they are usually 1-2 cm diam.; in addition the leaves are rarely as large as in cultivars.

The paucity of specimens in Australian herbaria is somewhat surprising. Perhaps as familiar and domestic plants they are not thought worthy of collection. Bailey (1906) reports the species as "abundant in all scrub clearings" (Queensland) but this is not reflected in herbarium specimens.

Specimens examined (all cited)

WESTERN AUSTRALIA: *Symon 7127*, 31.v.1971, King Edward River nr Kalumburu, naturalised in dense brush (ADW, PERTH).

QUEENSLAND: *Michael 884*, s.d., Mt Julian, nr Proserpine (BRI); *White s.n.*, Jan. 1907, Kangaroo Point, nr Brisbane (BRI); *Domin s.n.*, Dec. 1909, Harveys Creek, uncultivated (n.v., ?PR); *Kerr s.n.*, 30.ix.1963, Millaa Millaa (BRI); *Swan 74*, 14.vii.1974, Mt Dryander, nr Proserpine (ADW, BRI); *Sharp & Durrington 907*, 17.xi.1973, Bird Island, 1 km W of Dunwich on Stradbroke Island (BRI); *Byrnes 3849*, 13.iv.1978, Brandy Creek, Conway Range (BRI); *Stanley & Ross 78166*, 15.xi.1978, Rosedale (BRI); *Stanley & Ross 78228*, 17.xi.1978, 20 km from Sarina on St Lawrence road (BRI).

NEW SOUTH WALES: *Camfield s.n.*, 1.iv.1903, Gdns Govt Dom. (NSW); *Green s.n.*, Feb. 1910, Randwick (NSW); *Knox Grammar School s.n.*, 1.ix.1950, Beresford (NSW); *Johnson s.n.*, 9.v.1951, Broughton Pass Cataract R. (NSW).

SOUTH AUSTRALIA: *Symon 11274*, 3.x.1978, Beresford Tank (SW of Lake Eyre), a fresh water dam (ADW).

7. NIEREMBERGIA Ruiz & Pavon

Ruiz & Pavon, Fl. Peruv. et Chil. Prodr. (1794) 23.

Herbs, sometimes rhizomatous, some woody below. *Leaves* mostly simple, narrow, glabrous or pubescent. *Flowers* solitary, terminal or in short sympodia, pedicellate or subsessile. *Corolla* tube slender, elongate, limb expanded, campanulate or infundibuliform. *Stamens* 5, 4 didynamous, 1 shorter, inserted at the summit of the tube, surrounding the filiform style. *Stigma* expanded. *Fruit* a septicidal capsule, the valves deeply bifid at dehiscence. *Seeds* prismatic, reticulate-foveate.

A genus of about 30 species most of which occur in Argentina and adjacent countries with one disjunct species in North America. One species is widely grown as a garden plant and possibly naturalised in New South Wales.

1. *N. hippomanica* Miers, London J. Bot. 5 (1846) 168.

Type Citation: "Provincias Argentinas, vernacule chu chu. v.v." Miers then cites two entities a) "In Prov. Cordovae et San Ludov.", and b) "Achias".

Type material: Not seen.

Herbaceous perennial with a subwoody rootstock from which numerous slender branches arise to 45 cm tall. Pubescent with minute simple hairs. *Leaves* linear about 20 x 1-1.5 mm. *Inflorescence* of terminal pedicellate flowers or from the upper leaf axils. *Pedicele* c. 5 mm long. *Calyx* tube 5-6 mm long, obconic, the veins conspicuous, lobes 5-6 mm long, narrow triangular. *Corolla* tube 10 x 1 mm, abruptly expanded into the rotate to broadly stellate limb 1.5-2.5 cm diam., lobes rounded and divided $\frac{1}{4}$ the length of the limb, intense violet, close to RHS Bishops Violet 37/2 with a yellow eye. *Filaments* c. 6 mm long, inserted at summit of the tube, erect, long exerted and enclosing the style, sparsely glandular pubescent, 4 didynamous in two pairs, the fifth lower, the *anthers* closely surrounding the stigma. *Ovary* ovate, ovules numerous. *Style* slender, expanded to the lunate-laminar stigma. *Capsule* ellipsoid 3-4 mm long, smooth, dehiscent, enclosed within calyx tube. *Seeds* c. 1 mm long, dark brown to black, prismatic, reticulate-foveate.

Notes

Millan (1941) in his revision of the genus maintains twelve varieties of *N. hippomanica*. Our material appears close to *N. hippomanica* var. *caerulea* (Miers) Millan which is based on *N. caerulea* Miers, London J. Bot. 5 (1846) (Type Citation: "Punta del Sauce, Prov. Cordovae. v.s. in herb. Hooker." (Gillies MSS. *N. caerulea*). Type Material: not seen). The name *N. hippomanica* var. *violacea* Millan has been used on two earlier collections from New South Wales.

The species is considered toxic to horses in Argentina, Miers (1846) above. The collection from Delungra was associated with the death of turkey poults.

Specimens examined (all cited)

NEW SOUTH WALES: *Lloyd s.n.*, Nov. 1965, Delungra, "growing in backyard, suspected of poisoning poultry" (NSW); *Blaxell 691*, 16.xi.1971, Mt Arthur Lookout, 3 km W of Wellington, "herb ?naturalised, only plant seen" (NSW); *Rodd 3012*, 19.i.1976, Sydney Botanic Garden, "spontaneous in weedy waste-ground" (NSW).

9. PETUNIA Juss.

Juss., Ann. Mus. Paris 2 (1803) 215.

Herbs, stems often sprawling. Viscid-pubescent with glandular hairs. *Leaves* alternate or upper ones in pairs, entire, sessile or petiolate in young plants and later leaves sessile. *Inflorescence* axillary of a single pedicellate flower. *Calyx* campanulate, deeply lobed. *Corolla* funnellform or salverform, regular or slightly zygomorphic, shallowly or bluntly 5-lobed, white, pink, purple sometimes conspicuously veined or parti-coloured in cultivars. *Stamens* 5, inserted on the tube, 4 didynamous, the fifth shorter, *anthers* dehiscing by slits. *Ovary* bilocular, with a lobed hypogynous disc below, ovules numerous. *Style* slender, *stigma* dilated-capitate. *Fruit* a capsule, septicidal. *Seeds* numerous, globular, angled or prismatic, embryo curved or straight.

A genus of about 30-40 species mostly in South America with 1 species reaching North America. The genus is closely related to *Nicotiana* and differs principally in its solitary flowers and base chromosome number $n=14$ (*Nicotiana* $n=12$). The standard monograph remains Fries (1911).

Key to *Petunia* species

- 1. Leaves 1-1.5 cm long, linear-spathulate, corolla <1 cm long 3. *P. parviflora*
 Leaves 2-7 cm long, ovate to elliptic, corolla mostly >3 cm long 2
- 2. Corolla tube obconic, scarcely inflated, stamens inserted about the middle of the tube,
 corolla mostly white 1. *P. axillaris*
 Corolla tube somewhat inflated, stamens inserted below the middle of the tube, corolla
 often coloured 2. *P. × hybrida*

1. **P. axillaris** (Lam.) Britton, Sterns & Poggenburg, Prelim. Cat. (1888) 38.

Nicotiana axillaris Lam., Tabl. Encycl. 2 (1794) 7. *Basionym.*

Type Citation: "E Monte-Video, Commers. Caps. 2-locularis."

Type Material: Not seen, possibly at P.

Nicotiana obtusisepala Domin, Bibl. Bot. 89 (1929) 1147, plate 36, fig. 1.

Type Citation: Queensland; Hughenden (*Domin 11*, 1910).

Type Material: Not seen, PR, photo ADW!

The description is strongly suggestive of a *Petunia* and Goodspeed (1954) suggested that it represents *P. axillaris*. In his notes Domin considers the new species strongly remote from Australian species (of *Nicotiana*) yet scarcely introduced. I tentatively place it as a synonym of *P. axillaris* rather than *P. × hybrida* because of the relatively long scarcely inflated corolla tube.

Annual or short lived *perennial*, stems erect or decumbent. Viscid pubescent with erect glandular hairs of varied lengths, aromatic. *Leaves* 3-7 x 1.5-4 cm, ovate to elliptic, apex acute, base cuneate, lower leaves alternate, shortly petiolate, *petiole* to 2 cm long, winged, upper leaves sessile or subsessile, sometimes opposite, the upper leaves often increasingly reduced on mature flowering stems. *Inflorescence* of solitary, pedicellate, axillary flowers. *Pedicel* 2-4 cm long. *Calyx* c. 1.5 cm long, deeply lobed, lobes oblong, green, subfoliaceous. *Corolla* tube 3-4 cm long, obconic, scarcely inflated below the expanded limb, limb 4-6 cm diam., rotate or broadly stellate, slightly zygomorphic, limb divided about 1/5 into rounded lobes, apex acute or rounded, white with pale greenish veining and dark veins in throat, sweetly scented. *Stamens* 5, 4 didynamous, the fifth shorter. *Filaments* 10-15 mm long, inserted about the middle of tube, the two longer ones terminating just below the stigma, second pair shorter, the fifth shorter and uppermost, geniculate at point of attachment, glabrous. *Anthers* 2-3 mm long, versatile, pollen yellow. *Ovary* c. 3-4 mm long, bluntly conical, bilocular, the base shortly enclosed in 2-lobed nectariferous disc, ovules numerous. *Style* 2-3 cm long, erect glabrous, *stigma* capitate, expanded, green. *Petiole* to 6 cm long in fruit, erect, *capsule* about 1 cm long, bluntly conical, glabrous. *Seeds* about 0.6 mm diam. globular or sub-angular, reticulate-foveate, numerous.

Distribution

Occasional in south-eastern Queensland and sporadic in eastern New South Wales.

Note

P. axillaris is one of the larger flowered species and has been grown as an ornamental. With *P. integrifolia* and complex hybrids between them it has contributed to the domesticated garden petunia which was given the name *P. × hybrida*. *P. axillaris* is distinguished by its relatively long, straight-sided, obconic tube with the stamens inserted about half way up. Other species either have an inflated tube and/or stamen insertion much lower down. Whether the material naturalised in Queensland and New South Wales was derived from introductions of the species or from reversions of the garden petunia is not clear. Smith & Downs (1966) consider *P. nyctaginiflora* Juss. to be a synonym of *P. axillaris*.

Specimens examined (all cited)

QUEENSLAND: *Sharpe & Lebler 2476*, 9.i.1979, Moreton district, Helidon, on a roadside leading to Ziegler's quarry (BRI); specimens cultivated from this at ADW, BRI, CANB, K, MO, NSW); *Jessup 198*, 19.vi.1975, Moreton district, Worlds End Pocket, approx. 10 km N of Ipswich (BRI; specimens cultivated from this collection at ADW, BRI, CANB, K); *Sharpe 2520*, 20.i.1979, Moreton district, 3 km N of Coolum beach (BRI; specimens cultivated from this to ADW, BRI, CANB, K, MO, NSW).

NEW SOUTH WALES: *Boorman s.n.*, Sept. 1907, Bingara, evidently naturalised, found many miles from any habitation and is well distributed over a large area of country between Bingara and Warialda (NSW); *Burgess s.n.*, Nov. 1910, East Maitland (NSW); *Constable 6212*, 12.x.1965, Nepean River, Douglas Park, 9 km E of Picton, only few plants seen in area (NSW); *Jacobs 3377*, 9.xi.1978, Tenterfield Road, 30 km SE of Bonshaw, along roadside (NSW).

2. *P. X hybrida* Vilm., Fl. Pl. Terre I (1865) 615.

Type Citation: Citation and specimens not seen.

Common Name: garden petunia.

Annual or short lived *perennial* herb, stems usually decumbent. Viscid-pubescent with glandular hairs of differing lengths, aromatic. *Leaves* 3-6 x 1.5-4 cm, ovate to elliptic, apex acute or rounded, base cuneate. Lower leaves petiolate alternate, *petiole* often winged, upper leaves sub-opposite sessile, increasingly reduced in mature flowering stems. *Inflorescence* of solitary axillary flowers. *Pedicel* 2-4 cm long. *Calyx* c. 1.5 cm long, deeply lobed, lobes oblong or often in cultivars sub-foliaceous and green. *Corolla* tube 3-4 cm long, obconic, slightly inflated below the expanded limb, limb rotate or broadly stellate 4-10 cm diam., slightly zygomorphic, the lobes rarely cut more than 1/2 way, lobe apex acute or rounded, entire or undulate, single or double, frilled, veined, self or parti-coloured, dull yellow, white, rose, reddish or rich purple in the many cultivars available, sweetly scented. *Stamens* 5, 4 didynamous the upper one shorter. *Filaments* 15-18 mm long, attached to the lower half of tube, geniculate at point of attachment, glabrous. *Anthers* 2-3 mm long before dehiscence, versatile, pollen white, yellow or bluish. *Ovary* c. 3 mm long, bluntly conical, the base shortly enclosed by a lobed nectariferous disc, bilocular, ovules numerous. *Style* c. 2.5-3 cm long, slender, erect, *stigma* capitate, expanded. *Capsule* 1-1.5 cm long, ellipsoid, glabrous. *Seeds* c. 0.6 mm long, sub-globose or angled, reticulate-foveate, numerous.

Note

Several species, *P. axillaris* (syn. *P. nyctaginiflora*) and *P. integrifolia* (syn. *P. inflata*, *P. violacea*), and complex hybrids between them have contributed to the garden petunia (Natarella and Sink, 1974). Numerous cultivars are available and they are very widely grown as ornamentals.

Selected specimen

NEW SOUTH WALES: *Rodway s.n.*, Nov. 1923, Yalwal, 15 miles SW of Nowra, old mine bldgs (NSW).

3. *P. parviflora* Juss., Ann. Mus. Paris 2 (1803) 216, t. 47, fig. 1.

Type Citation: No type material was cited but the description was based on plants from La Plata in the Commerson herbarium and therefore it may be at P.

Prostrate or decumbent herb 15-20 cm long, *annual* or possibly *perennial* as the lower stems have abundant adventitious roots. Pubescent with abundant minute glandular hairs. *Leaves* 5-12 mm long, oblong-linear to spatulate, entire, sessile. *Inflorescence* of solitary axillary flowers. *Pedicel* 1-2 mm long. *Calyx* 5-6 mm long, the lobes linear-spatulate, intersepal membranes distinct. *Corolla* 5-9 mm long, funnel shaped, shallowly lobed, slightly exceeding the calyx lobes; *filaments* 3-4 mm long, attached near the base of the tube, 4-didynamous, the fifth shorter; *anthers* 0.5 mm long; style 3-4 mm, bent at tip. *Capsule* 3-5 mm long, two lipped, much exceeded by the spatulate calyx

lobes. *Seeds* 0.5 mm diam. subglobular, numerous, light brown, reticulate-foveate.

Specimens examined (all cited)

NEW SOUTH WALES: *Burges s.n.*, Nov. 1910, Stockton Beach, East Maitland (NSW); *Oakman s.n.*, 17.i.1941, Newcastle district (NSW); *Oakman s.n.*, 28.i.1941, Nobby's Head, Newcastle, military camp (NSW); *O'Reilly*, April 1948, Boggabri district (NSW).

8. PHYSALIS L.

L., Sp. Pl. (1753) 182; Gen. Pl. (1754) 85.

Plants *annual* or rhizomatous herbaceous *perennial* to subwoody short lived shrubs. Glabrous or pubescent with simple, forked, stellate or glandular hairs. *Leaves* linear to broad ovate, alternate, often geminate, petiolate. *Flowers* solitary, pedicellate, in leaf axils or stem forks. *Corolla* campanulate to rotate with an expanded limb, mostly yellowish, often with darker spots towards the base. *Stamens* 5; filaments attached near the base of the corolla tube; anthers oblong, opening by slits, yellow or bluish. *Ovary* bicarpellate, ovules numerous on enlarged placenta; style simple, erect. *Fruit* a berry enclosed in the enlarged calyx tube. *Seeds* lenticular, numerous.

A large genus of probably more than one hundred species well represented in North and South America with a few species recorded from temperate and tropical Asia. Several species are cultivated for their fruit and are now adventive, while several others are weedy in tropical and warm temperate areas. Despite the extensive accounts by Waterfall (1958, 1967) the species are still often difficult to identify especially as his monograph does not specifically include Europe, Asia or Africa. Menzel (1951) provides information on the cytotaxonomy and genetics of *Physalis*.

Many nomenclatural problems will remain almost insoluble until the names and taxa in Africa and Asia are studied and compared with American taxa. There is little doubt that cultivated and sub-weedy species of American origin were distributed at an early date and there are many superfluous names in existence.

Key to *Physalis* species

1. Herbaceous perennials with rhizomatous rootstock, tomentum of simple or forked hairs 2
Annuals or softwooded subshrub sparsely or densely pubescent with simple or glandular hairs, never forked 4
2. Corolla drab white, the limb distinctly 5-lobed, fruiting calyx orange or red (cultivated) 1. *P. alkekengi*
Corolla yellowish, the limb more or less entire, fruiting calyx greenish, yellowish or ochraceous 3
3. Tomentum of minute forked hairs, rarely simple (lens needed) leaves toothed or sinuate, ovate-lanceolate 9. *P. viscosa*
Tomentum of simple hairs, leaves often with few weakly developed lobes, elliptic 8. *P. virginiana*
4. Obviously pubescent, hirsute or pilose with erect, simple or glandular hairs, corolla conspicuously spotted 5
Sparsely pubescent or glabrescent, corolla blotches brownish or dull 6
5. Annual, anthers 2 mm, seeds 1.5 mm, calyx prominently 5-angled 7. *P. pubescens*
Softwooded subshrub, anthers to 4.5 mm, seeds 1.75-2 mm, calyx more or less 10-angled, "Cape gooseberry" 5. *P. peruviana*
6. Anthers 3-4 mm, twisted after anthesis, flowers bright yellow, mostly >2 cm diam., berry mostly >1.5 cm diam., "tomatillo" 6. *P. philadelphica*
Anthers <3 mm long, straight, flowers rarely >1.5 cm diam., berry <1.5 cm diam. 7
7. Leaves narrow elliptic, flower pedicels very slender 2.5-3 cm long, flowers whitish yellow 3. *P. lanceifolia*
Leaves ovate-lanceolate, pedicels usually <2.5 cm long, flowers yellow or creamy yellow 8
8. Pedicels rarely >1 cm, corolla yellow, style 2-2.5 mm, stigma capitate, expanded, fruiting calyx circular in section, the angles not evident 2. *P. ixocarpa*
Pedicels mostly >1 cm, corolla creamy yellow, style to 5 mm long slender, fruiting calyx with 5 main and 5 minor angles, reticulate veining conspicuous 4. *P. minima*

1. *P. alkekengi* L., Sp. Pl. (1753) 183.

Type Citation: "Habitat in Italia".

Type Material: Herb. LINN not seen. Microfiche AD!

Common Name: Chinese lantern.

Herbaceous *perennial*, 50 cm tall, rarely branched, sparsely pubescent with long simple hairs. *Leaves* to 8 x 5 cm, commonly about 6 x 4 cm, geminate and appearing opposite, ovate, sometimes with a few weakly developed lobes or teeth, apex acute, base broadly cuneate to rounded; *petiole* 1-2.5 cm long, grooved above. *Inflorescence* a solitary pedicellate flower from the leaf axil. *Pedicel* 1-1.5 cm long. *Calyx* c. 1 cm long, divided about half way into acutely triangular lobes, densely pubescent. *Corolla* 13-17 mm long, the lobes 3-4 mm long, broadly triangular, drab white or pale yellow, spots not evident (dried material), pubescent towards the base. *Filaments* c. 4 mm long, glabrous. *Anthers* 4 mm long. *Ovary* 3 mm long, bluntly conical. *Style* 8-9 mm long, erect, glabrous. *Stigma* capitate, style and stigma projecting well beyond the anthers. Fruiting pedicels pendulous, the calyx to 5 x 4 cm, showy, orange-red, *berry* about 1.5 cm diam. reported red to orange but not seen.

Note

P. alkekengi is occasionally grown as a garden novelty. Willis (1972, p. 548) records it as sporadic in his areas J and N (Ballarat-Melbourne) but I have seen no specimens from there. It is readily distinguished by its distinctly 5-lobed corolla and colourful mature calyx.

Specimens examined

NEW SOUTH WALES: *Briggs s.n.*, 15.iii.1933, Broken Hill garden (ADW).

SOUTH AUSTRALIA: *Nagy s.n.*, 28.iv.1973, Norwood, garden grown (AD, ADW, CANB).

2. *P. ixocarpa* Brot. ex Hornem., Suppl. Bot. Hafn. (1819) 26.

Type Citation: "Hab.—T. intr. 1815—Est *Phys. angulata* horti hafn. sed sine dubio spec. distincta".

Type Material: At C. Not seen, for photo and discussion see Fernandes (1970).

Common Name: ground cherry.

An *annual* to 50 cm tall. Sparsely pubescent with minute simple hairs, on the stems mainly confined to a groove on the upper side, becoming glabrous. *Leaves* to 10 x 4.5 cm, commonly about 6 x 3 cm, ovate-lanceolate, irregularly toothed and lobed, apex acute to acuminate, base cuneate, oblique, strongly malodorous. *Petiole* to 6 cm, commonly 2-3 cm long. *Flowers* solitary in the leaf axil. *Pedicel* c. 1 cm long. *Calyx* 5 mm long, divided into triangular lobes 1.5-2 mm long. *Corolla* 10-12 mm diam. when flattened out, pentagonal to broadly stellate, pale yellow, with five dull brownish blotches, tufts of pale hairs below the blotches, swollen into shallow pouches below the hairs each with an inconspicuous nectary. *Filaments* 2.5-3 mm long, glabrous, lavender, loosely erect, a tuft of dendritic hairs between the filament bases and surrounding the nectary. *Anthers* 1-1.5 mm long, with a dark margin. Pollen white. *Ovary* bluntly conical, disc pale green, inconspicuous. *Style* 2-2.5 mm long. *Stigma* 1 mm diam. capitate, green, conspicuous, below the level of the anthers. *Fruiting calyx* c. 2 cm diam. 2.2-2.5 cm long, circular in section, ribs scarcely evident, the main body of the calyx almost globular, not highly shouldered, with slight purple veining, mature calyx pale green. *Berry* 11-14 mm diam., globular, green, (close to Scheeles Green RHS 860), slightly sticky. *Seeds* c. 2 mm diam., lenticular. *Cotyledons* 9-10 mm long, ovate-lanceolate, apex acute, hypocotyl c. 2 cm long.

Distribution

See Map 6.

Notes

The name *P. ixocarpa* refers to the sticky berry but each of the six species of *Physalis* I have grown has had a berry somewhat sticky and I do not consider stickiness to be a very useful diagnostic character.

A critical account of the history and identity of *P. ixocarpa* is given by Fernandes (1970). In Australia it has commonly been called *P. angulata* or confused with *P. minima*. The name has also been used widely for the plant now known as *P. philadelphica*, the domesticated "tomatillo".

I have referred the collection *C. T. White 12583*, 9.i.1944, Tummaville, to this species. Progeny from this collection were studied by Menzel, *Proc. Amer. Philos. Soc.* 95 (1951) 132-183, she refers to it at length (her No. 493b.) 135, 157-161, and gives the chromosome number as $2n=24$ (diploid), karyology in fig. p. 139. The collection yielded a vigorous hybrid with *P. angulata*. Of interest is her equation of the Australian collection with two from Portugal, as the more recent paper by Fernandes shows that the Portuguese plants are *P. ixocarpa* sensu strictum non auct. plur. (= *P. philadelphica* Lam.). Menzel did not consider her collection to agree with her concept of *P. ixocarpa* (= *P. philadelphica*). She did consider it to be closest to some species in the *Angulatae* group of species ie. *P. lagascae*, *P. angulata*, *P. ixocarpa*, *P. lanceifolia*. The only cross that provided germinable seeds was that with *P. angulata*, and the hybrid was large, vigorous and sterile; no seeds were obtained in over 1000 fruits. The hybrid plants were triploid. Unfortunately no crosses with the Portuguese plants seem to have been made. "The identity and origin of *P. sp.* 493b remains questionable However it is worthy of note that of all crosses tried with *P. ixocarpa* (= *P. philadelphica*) 493b was the only one which yielded seeds approaching maturity It may be regarded as a connecting link between *P. ixocarpa* and *P. angulata*, distinct from both, but, from karyological and breeding evidence, probably more closely related to the latter".

Although the first record in Australia is a collection sent in by the Agricultural Bureau from Miranda, N.S.W. in 1925, the species was not collected again until it spread widely in both Queensland and New South Wales in the mid to late 1940's suggestive of a wartime introduction. It definitely appears to be more weedy and aggressive than *P. minima* and where label details are available it is described as "weed of fallows; cultivated areas; on cultivated land; in summer cultivated crops of the north coast; recent introduction on open pasture; natural pasture cultivated two years ago".

Specimens examined (all but 2 cited)

QUEENSLAND: *White 12583*, 9.i.1944, Tummaville (BRI); *White 12803*, 3.vi.1946, between Toowoomba & Warwick (BRI); *Pointon s.n.*, 18.xii.1948, Kingaroy (BRI); *Smith s.n.*, 8.ii.1949, Warwick, Darling Downs (BRI); *van Rosendal s.n.*, 19.vi.1963, Elliott River bank S of Bundaberg (BRI); *Little s.n.*, 31.i.1964, Swan Creek 1 mile E of Hermitage (BRI); *Knowles & Lebler s.n.*, 25.xi.1964, Cannon Hill (BRI); *Beckman s.n.*, 6.i.1965, 4 miles from Kenmore Junction along Moggill Rd, nr Mt Crosby road junction (BRI); *Alcorn s.n.*, 15.v.1967, Burnside via Nambour (BRI); *Durrington 476*, Jan. 1973, Serpentine Creek, 11 km NE of Brisbane (BRI); *Cent s.n.*, 6.iii.1973, Indooroopilly (BRI).

NEW SOUTH WALES: *Agric. Bur. s.n.*, Apl 1925, Miranda (NSW); *Couch s.n.*, 24.iii.1948, Yellow Rock, Albion Park (NSW); *Cutler s.n.*, Jan. 1949, Oakwood via Inverell (NSW); *Baird s.n.*, Mch 1950, Dubbo (NSW); *Noy s.n.*, Jan. 1951, Bellata (NSW); *Johnson s.n.*, Apl 1951, Inverell (NSW); *Vane s.n.*, Mch 1956, Kyogle (NSW); *Bootes s.n.*, 4.iv.1956, nr Llangothlin (NSW); *Montgomery s.n.*, 24.iii.1958, Ashley (NSW); *Green s.n.*, 2.vi.1961, Richmond (NSW); *Burgess s.n.*, 10.iv.1970, Mt Irvine (BRI); *McBarrow 20181*, 18.v.1971, Vet. Res. Stn, Glenfield (NSW); *Ryan s.n.*, 14.iii.1973, Scone (NSW); *Townsend s.n.*, 17.iv.1973, Alectown (NSW); *Martin s.n.*, 31.i.1974, Kilgra (NSW); *Pritchard s.n.*, 11.vi.1976, 'Morcott', Moree (NSW).

3. *P. lanceifolia* Nees, *Linnaea* 6 (1831) 473.

Type Citation: "Habitat in Peruvia (Ruiz et Pavon); in Mexico (Herb. Hort. Reg. Ber.)—In Amer. bor.?(Michx.) Vidi siccam in Herb. Hort. Reg. Ber."

Type Material: Not seen.

Annual to 50 cm tall, sparsely pubescent on young growth with minute, appressed, antrorse, simple hairs, glabrescent. *Leaves* to 12 x 3 cm, more commonly about 5-7 x 2 cm, narrow elliptic, entire, sinuate or with several forward pointing lobes, lobes 1-4 mm long, apex rounded or acute, sinus rounded, leaf apex acuminate, base long cuneate. *Petiole* to 4 cm long, commonly c. 1.5-2 cm long, grooved above. *Inflorescence* a solitary flower from leaf axils and stem forks. *Pedicel* 2-3 cm long, slender. *Calyx* 4-5 mm long, divided about $\frac{1}{3}$ of the way into triangular lobes. *Corolla* c. 1 cm diam. pentagonal, almost white at the margin suffused deeper yellow towards the base, the blotches deeper yellow and poorly defined, corolla tube swollen into shallow pouches between the filaments, pubescent below the blotches and between the filaments with sparsely dendritic pale hairs. *Filaments* 2-4 mm long, slender, glabrous. *Anthers* 1.5-2 mm long white or very pale blue, pollen white. *Ovary* 1.5 mm long, almost globular, disc pale orange-yellow. *Style* 2.5-3 mm long slightly expanded upwards. *Stigma* capitate, green, slightly expanded. Fruiting pedicel 2.5-4.5 cm long, calyx 2-3 cm long 2-2.5 cm wide, 10-angled, veins purplish. *Berry* (7-) 11.6(-15) mm diam. olive-green suffused purple when mature, sticky. *Seeds* 1.75-2 mm long, lenticular, a mean of 85 in six fruits counted.

Distribution

See Map 5.

Notes

This species is confined to seasonally wet areas with heavy clay soils. Collectors describe "grey cracking clay; brown clay loams; drying mud; solonized brown clay; grey self mulching soil and dry clay beds".

The species is distinguished from other species of *Physalis* by its relatively long slender pedicel, small corolla and shallowly lobed elliptic leaves. It is apparently a relatively recent arrival in Australia, the first collections coming from Dalby, Qld in 1924. The species is native to southern United States and to Mexico.

Specimens examined (all cited)

QUEENSLAND: *McCarthy s.n.*, Apl 1924, Dalby (BRI); *Guard s.n.*, Apl 1947, 30.v.1947, Dalby (BRI); *Pedley 380*, 15.i.1959, Hannaford (BRI, CANB, K); *Johnson 2245*, 27.iv.1961, Reedsdale, 5 miles NW of Brymount (BRI, K); *Alcorn s.n.*, 25.v.1964, cult. Brisbane, seed from Brookstead (BRI); *Smith s.n.*, Feb. 1972, "Aberdeen", Wyaga, 65 km SW of Millmerran (BRI); *Wilson 1833*, 28.iii.1978, 36 km NE of Hebel on Dirranbandi road (NSW); *Duggan s.n.*, 14.ii.1979, Tiaro Shire, corner Bruce Highway and Neerdie Road (BRI).

NEW SOUTH WALES: *Everist 540*, 8.xii.1969, 21 km E of Walgett on Pilliga Rd (BRI); *Pritchard s.n.*, 11.vi.1976, "Glennie", Moree (NSW); *Wilson 1798*, 28.iii.1978, Narran Road on Goodooga-Lightning Ridge Road (BRI, NSW); *Wilson 2007*, 25.xii.1978, "Iolanthe", 26 km SW of Garah (BRI, NSW).

VICTORIA: *McBarrow 5516*, 21.iii.1951, Wodonga (NSW).

4. *P. minima* L., *Sp. Pl.* (1753) 183.

Type Citation: "Habitat in Indiae aridis sordidis".

Type Material: Not seen. Heine (1976, p. 129) cites a lectotype in Herb. Hermann (BM, photo. ADW!). For discussion of typification see Heine, l.c., and note below.

P. parviflora R.Br., *Prodr.* (1810) 447.

Type Citation: "(T.) v.v.", i.e. *Litus intra Tropicum*, the coast of Queensland and Northern Territory westward to Arnhem Bay.

Type Specimen: Not seen (probably at BM).

Common Name: wild gooseberry.

A bushy *annual* rarely to 50 cm long. Pubescent on young tips, calyces, with minute (lens needed) simple, antrorse hairs, becoming glabrous. *Leaves* to 10 x 6 cm, more often 4-6 x 2-3 cm, ovate-lanceolate, entire or with up to c. 7 teeth (to 5 mm long) or shallow angular lobes on each side, apex acute to acuminate, base rounded to cuneate, often oblique. Petiole to 6 cm long, more often c. 1-3 cm. Flowers solitary from leaf axil. *Pedicel* 2-2.5 cm long at anthesis. *Calyx* c. 5 mm long, divided about half way into acutely triangular lobes, minutely pubescent. *Corolla* 7-8 mm long, c. 15-16 mm diam. pentagonal, pale creamy yellow with five relatively large brownish spots, diffuse on their outer margin and cut off below by a ring of hairs, centre of corolla appearing slightly greenish yellow, corolla tube slightly swollen into shallow pouches each containing a nectary, corolla tube glabrous between the filament bases. *Filaments* 4-5 mm long, erect, glabrous, slightly speckled brown. *Anthers* 2-2.5 mm long, grey-blue or pale blue, pollen white. *Ovary* 1-1.5 mm long, bluntly conical, disc pale yellow-green. *Style* 4-5 mm long, erect, tinged green. Stigma green, just equal to the height of the anthers. *Berry* 8-14 mm diam. globular, enclosed in the inflated calyx 25-30 mm long, with five principal and five minor veins. *Seeds* 1.5 mm long, flattened, pale yellow, minutely reticulate, numerous. *Cotyledons* 8-9 x 5-6 mm, ovate, glabrous, hypocotyl 1-1.5 cm, minutely pubescent.

Distribution

See Map 6.

Notes

Waterfall (1967, pp. 221-222) considers *P. minima* L. a *nomen confusum* but Heine (1976) 130, considers it can be typified without ambiguity and proposes the lectotype "Solanum vesicarium zeylanicum baccis folliculis herbaceis" numbered 97 in the Hermann collection at the BM (photo ADW). The specimen is a leafy shoot with four fruits, flowers are not visible. Most of the Australian collections have leaves that are more lobed and have less rounded leaf bases than this specimen. As far as one can judge the fruits do not differ significantly. The Hermann specimen also matches six duplicates from MO determined as *P. angulata* L. (type Herb LINN 247.9 microfiche AD! "Habitat in India utraque"). I doubt that these two names represent different species but as far as I can trace they have not been formally treated as synonyms. Waterfall does not treat these two species as synonymous, but considers *P. minima* L. when treating *P. lagascae* Roem. & Schult., which Heine, l.c., considers a synonym of *P. minima*. The latter species has bluish or violet anthers and hairs 2-4 mm long, these hairs being totally absent from Australian material. However, he does include *P. lagascae* var. *glabrescens* Schulz, described as "less hairy, glabrate, the stems with few hairs or none". As Waterfall did not publish an account of *Physalis* in Eurasia we do not know his views on this problem.

P. minima is widespread across northern Australia and has been extensively collected. It also appears to extend to the tropics north of Australia. The collections suggest that it was a pre-1788 introduction. However like *Datura leichhardtii* and *Solanum erianthum* it is a discordant element in the Australian flora and, like them, may have resulted from the earliest European contacts between Central America and South East Asia. If so, there would have been nearly 250 years for spread, change and adaptation even before 'Species Plantarum' (1753) and 300 years before the earliest colonisation, but not necessarily earliest contacts with Australia. A rapidly expanding population is likely to be a more variable one and this could account for the variability of the South East Asian specimens and the present inability to match these precisely with any American taxa. *P. minima* has been confused with *P. ixocarpa* but does not appear to be so aggressively weedy as that species.

Selected specimens

WESTERN AUSTRALIA: (selected from 24 specimens examined): *Perry 3043*, 26.vii.1952, Kimberley Res. Stn (AD, BRI, CANB, K, MEL, NSW, NT); *Royce 6927*, 8.v.1962, Mt Anderston Stn, Fitzroy River (L, PERTH); *Symon 10255*, 31.v.1975, Mt House Stn (ADW, MO, PERTH); *Pullen 10725*, 15.iv.1977, 14 km S of Forest Creek, nr Ord Hill (CANB, PERTH, WIR).

NORTHERN TERRITORY (selected from 39 specimens examined): *Specht 175*, 4.iv.1948, Darwin, Nightcliff (AD, BRI, CANB, K, MEL, NSW); *Perry 2690*, 11.viii.1949, Victoria River NE of Auvergne Stn (AD, BRI, CANB, K, MEL, NSW, NT); *Wilson 376*, 7.iii.1965, Maude Creek, 19 km NE of Katherine (BRI, CANB, K, L, NSW, NT, US); *McKean B190*, 23.xii.1971, Humpty Doo Expt. Rice Farm (CANB, DNA, K, NT); *Latz 6064*, 2.vii.1975, Elcho Island (CANB, DNA, L, NT); *Must 1579*, 10.vii.1977, Victoria River crossing (CANB, CBG, DNA, NT).

QUEENSLAND (selected from 79 specimens examined): *Brown s.n.*, 1802-5, east coast (MEL); *Smith 3032*, 15.iv.1947, Kingarry (BRI, CANB); *McKee 9060*, 15.iv.1962, Mareeba (CANB, NSW); *Symon 4807*, 20.v.1967, 40 km S of Laura (ADW, BRI, CANB, US); *Symon 4844*, 22.v.1967, 19 km N of Musgrave Stn (ADW, BRI, K); *Byrnes 3642*, 6.iv.1978, Eungella Dam (BRI).

NEW SOUTH WALES (all cited): *Bauerlin s.n.*, Oct. 1892, Ballina (NSW); *Guilfoyle s.n.*, s.d., Tweed River (MEL); *Simmonds s.n.*, Apl 1897, Richmond River (BRI); *Cheel s.n.*, 31.v.1911, Penshurst (NSW); *Straatmans 323*, 19.vii.1959, 16 km N of Wauchope (CANB); *Salasoo s.n.*, 7.i.1971, Nymboida to Clouds Creek (NSW); *Coveny 6584 & Powell*, 10.vi.1975, Cockle Creek N of Booragul (ADW, BRI, CANB, NSW, [G, HUJ, KW, KYO, L, LE, MO, NBG, P, PRE, RSA, S, UC, W not seen]).

5. *P. peruviana* L., Sp. Pl. ed. 2, 2 (1763) 1670.

Type Citation: "Habitat Limae. Alstraemer ".

Type Material: Not seen (Microfiche Herb. LINN, AD!).

Common Name: Cape gooseberry

Soft wooded, short lived *shrub* to about 1 m tall, straggly with age, unarmed. All parts densely pubescent with tomentum of erect simple or glandular hairs to 1 mm long. *Leaves* in alternate pairs, one larger than the other, to 13 x 13 cm but mostly about 6 x 4 cm, ovate-acuminate, base cordate, margin entire or with few blunt angular lobes or the lobes developed, triangular, c. 0.5 cm long, apex acuminate; *petiole* to 5 cm long, commonly about 2-3 cm. *Inflorescence* a solitary pedicellate flower in the leaf axil. *Calyx* 1-1.5 cm long, densely pubescent, purplish, divided about half way into acuminate-triangular lobes. *Corolla* 1.5-2 cm diam. rotate to shallowly 10-lobed the inter-acuminal tissue exceeding the acumens, sparsely pubescent outside on the main veins, yellow with well defined purple-brown blotches towards the base, swollen into shallow nectary pouches between the filaments and densely pubescent with pale yellowish dendritic hairs below the blotches and around the nectaries. *Filaments* 3-5 mm long, purplish. *Anthers* 4-4.5 mm long, bluish, pollen pale. *Ovary* 2-2.5 mm diam. rounded, glabrous, disc pale orange-yellow. *Style* 5-7 mm long, erect, purplish. *Stigma* capitate, expanded. *Berry* 1.5-2 cm diam, globular, aromatic, pale ochre-yellow when ripe, totally enclosed in the inflated angular calyx tube c. 3-3.5 cm long, the veins often prominent, the calyx lobes free at the apex up to 1 cm, acuminate, the whole pale yellowish-green when ripe finally drying pale brown. *Seeds* 1.75-2 mm long, discoidal, light bright brown, minutely shallowly reticulate, 106 and 111 in two fruits counted. *Cotyledons* 7 x 4-5 mm, ovate, sparsely pubescent, hypocotyl c. 1 cm long, densely pubescent.

Distribution

See Map 4.

Notes

P. peruviana has been widely cultivated as a minor fruit crop in the warm temperate areas of the world (Legge, 1974). It has become naturalised in disturbed sites in warm temperate areas frequently in mesic conditions. The fruits are aromatic and palatable and if not eaten fresh can be cooked. The specimen cited by Bentham, N. Australia, Sturt

River, *F. Mueller* (MEL!) almost surely comes from the Sturt River a little south of Adelaide. There seem to be no recent collections from W. Australia.

Selected specimens

WESTERN AUSTRALIA: *Oldfield 501*, s.d., Cape Leschenault (MEL); *Oldfield 501*, s.d., estuary of the Murray swamps (MEL).

NORTHERN TERRITORY: *Schultz s.n.*, s.d., Pt Darwin (K).

QUEENSLAND (selected from 16 specimens examined): *Mueller s.n.*, s.d., Brisbane River (K, MEL); *White 7742*, 3.vi.1931, Upper Brookfield, nr Brisbane (BRI); *Shepherd 738*, 6.xi.1966, nr Imbil (CANB, NSW); *Dowling s.n.*, 18.x.1968, Indooroopilly (BRI); *Stocker 1509*, 16.viii.1976, Python logging area, Danbulla (BRI); *Stanley 7823*, 18.vii.1978, Long Pocket (BRI).

NEW SOUTH WALES (selected from 37 specimens examined): *Brown s.n.*, s.d., Pt Jackson (K); *Beckler s.n.*, s.d., Clarence River (K, MEL); *Evans 2557*, 22.xi.1966, Boyne Nat. Pk (A, CANB, K, L, MEL, NSW); *Coveny 6290*, 4.v.1975, Audley, Roy. Nat. Pk (BRI, NSW); *Powell 235*, 1.x.1975, 9 km NE of Bulahdelah (ADW, NSW).

LORD HOWE ISLAND: *Boorman s.n.*, May 1920, Lord Howe Island (NSW); *Johnson & Rodd 1228*, 9.ix.1970, Lagoon shore nr Hunter Bay (NSW); *Rodd 1750*, 23.iii.1971, gully behind North Beach (NSW); *Pickard 1480*, 17.v.1971, Summit Ridge of Mt Lidgbird (NSW); *Pickard 2828*, 12.xii.1975, S end of Little Slope (NSW).

VICTORIA (all cited): *Robbins s.n.*, 1937, Orbost above Betchely (MEL); *Willis s.n.*, 15.viii.1944, Kalimna Gully, Lakes Entrance (MEL); *Beaglehole 39101*, 1950, Moleside Creek, Lower Glenelg Nat. Pk (MEL); *Beaglehole 32965*, 30.xii.1969, Mullet Creek, Mallacoota Inlet (MEL); *Beaglehole 43943*, 7.i.1974, 6.5 km W of Apollo Bay (MEL).

TASMANIA: *Copley 4667*, 17.i.1975, Boat Harbour, Wynyard area (AD, BM).

SOUTH AUSTRALIA (all cited): *Mueller s.n.*, 1849, Sturt River (MEL); *Blandowski s.n.*, Sept. 1849, between Adelaide and Hahndorf (MEL); *Black s.n.*, 26.xii.1908, on a creek nr Yankalilla and Normanville (AD); *Cleland s.n.*, 20.i.1926, 10.xi.1950, Upper Hindmarsh River (AD); *Cleland s.n.*, 28.ii.1946, Mt Benson (AD); *Hilton 1501*, 20.vi.1955, Waterfall Gully Creek (ADW); *Eichler 14580*, 31.xii.1957, Waterfall Gully (AD); *Symon 2933*, 22.viii.1964, Waterfall Gully (ADW, K); *Swinbourne s.n.*, 28.vi.1969, Hindmarsh Falls (AD); *Symon 10560*, 27.i.1976, Hindmarsh Falls (ADW).

6. *P. philadelphica* Lam., Encycl. 2 (1786) 101.

Type Citation: "This Coqueret was cultivated in 1784 in the Kings Garden; we believe it originated from northern America".

Type Material: Herb, Lam. (P, not seen).

P. ixocarpa auct. pl., non Brot. ex Hornem.

Common Name: tomatillo.

Annual to 50 cm high, sparsely pubescent with erect, few-celled hairs and smaller appressed hairs mainly on the younger stems. *Leaves* to 12 x 8 cm more often c. 6 x 3 cm, ovate-lanceolate, apex acuminate, margin sparsely and irregularly toothed, base bluntly cuneate, oblique. *Petiole* (1.5-) 3-4 (-7) cm long, grooved above and pubescent in groove. Flowers solitary in leaf axil and in stem forks. *Pedicel* 3-13 mm long. *Calyx* tube c. 4 mm long, the lobes 4-5 mm long, broadly triangular, sparsely pubescent along main veins. *Corolla* 1.5 cm long, c. 2.5-3.0 cm diam. when flattened out, the limb both reflexed and pleated, rotate, margin entire except for inconspicuous acumens, close to Aureolin yellow, with five brownish spots in the throat which are terminated below by a ring of dendritic hairs which fill the space between the corolla and the filaments, and extend down and surround the nectaries, corolla tube slightly swollen into small pouches below the spots each of which contain a nectary, glabrous outside. *Filaments* 4-5 mm long, sometimes slightly unequal, blue, glabrous. *Anthers* 3-4 mm long, with dark bluish margins, pollen white, top of anther twisted towards the stigma after anthesis. *Ovary* c. 1.5 mm diam. bluntly conical, green, glabrous. *Style* 8-9 mm long, erect, exceeding the anther tips, blue. *Stigma* green, scarcely expanded. Fruiting calyx (25-) 30 (-35) mm diam., (22-) 31 (-36) mm long, the 10 angles not prominent, almost circular in cross section, paling to yellowish green at maturity with or without purplish veins. *Berry* (17-)

24 (-30) mm diam., (16-) 22 (-28) mm long, dark green paling to whitish green flushed purple where exposed or under cold conditions, slightly sticky to touch, calyx well filled or completely filled by the berry. *Seeds* 2-3 mm diam., broadly reniform, (55-) 161 (-364) in fifteen berries counted. *Cotyledons* 7-8 x 13-15 mm, ovate-oval.

Distribution

Sparingly naturalised in south-eastern Queensland and north-eastern New South Wales.

Notes

P. philadelphica may be distinguished by its relatively large bright yellow flowers and more especially by the anthers characteristically twisted after dehiscence. The few specimens in Australian collections had previously been called *P. angulata* and *P. ixocarpa* and the species was probably introduced under the latter name. It is one of the species of *Physalis* that is occasionally cultivated as a novel edible berry but does not appear to be as attractive to eat as *P. peruviana*. This is probably the species referred to by Beadle, Evans & Carolin (1972, p. 486) as *P. angulata* L. A note on a specimen collected by C.T. White at Killarney in Nov. 1917, bears the note "makes excellent jam, better than Cape Gooseberry".

Heiser (1969, p. 109) describes it (as *P. ixocarpa*) as an old cultivated plant of Mexico and Guatemala and it was more frequently cooked than eaten raw.

Waterfall (1967, p. 214) describes two varieties and one form: forma *pilosa* with pedicel and calyx more or less pilose; var. *parviflora* with smaller flowers and anthers and var. *immaculata* with the corolla blotches being faint or absent. For a recent critical discussion of the nomenclature of this species see Fernandes (1970).

Specimens examined (all cited)

WESTERN AUSTRALIA: *Major & Son s.n.*, 10.ii.1961, Spearwood (PERTH).

QUEENSLAND: *White s.n.*, Nov. 1917, Killarney (BRI); *Ellis s.n.*, 1.x.1960, Brisbane (cult.) (BRI); *Henderson 360*, 22.ii.1968, Mt Wilson, E of Warwick (BRI); *Woodman s.n.*, June 1960, Peachester (BRI); *Pratten s.n.*, 30.v.1978, Mt Kilcoy (BRI).

NEW SOUTH WALES: *White 12558*, 15.iii.1944, Acacia plateau (BRI); *Everist & Webb 1389*, 23.xi.1946, Clarence River, nr Little Oakey Creek, Stanthorpe-Woodenberg Rd (BRI).

VICTORIA: *Reader s.n.*, 8.iv.1898, Warners garden, Coker Dam nr Dimboola (MEL); *Smith s.n.*, Mch 1944, cult. garden at Kew (MEL).

7. *P. pubescens* L. Sp. Pl. (1753) 183.

Type Citation: "Habitat in India utraque Θ ".

Type Material: Not seen (Microfiche Herb. LINN, AD!).

Annual to 50 cm tall, pubescent with simple or glandular hairs, lower stem hirsute, pilose to hispid above. Lower *leaves* to 10 x 8 cm but mostly c. 6 x 4 cm, ovate to ovate-elliptic, margin with small teeth or blunt triangular lobes, apex acuminate, base cordate, oblique. *Petiole* to 7 cm long but commonly 1-3 cm. Flowers solitary from stem forks and leaf axils. *Pedicel* to 10 mm long. *Calyx* tube c. 2 mm long, lobes 3-4 mm long, triangular, pubescent. *Corolla* 7-11 mm long, 15 mm diam. pentagonal, yellow with five distinct purple-brown spots sharply demarcated and not confluent, tufts of hairs at the base of each spot, extending down to form a ring of sparse pubescence around each nectary, corolla tube slightly inflated below each spot into shallow pouches each containing a nectary, pubescent outside where exposed in the bud. *Filaments* 3-5 mm long, lavender-purple, slightly swollen upwards, contracted below the anther, sparsely pilose. *Anthers* c. 2 mm long, purple margined, pollen white. *Ovary* c. 2 mm long bluntly conical, glabrous, annular disc paler yellow-green. *Style* 4-5 mm long, erect, whiteish. Stigma green. Fruiting calyx enlarged, 3-4 cm long, prominently five-angled, pale yellowish green to light brown when mature. *Berry* 1.2-1.5 cm diam., yellowish green, globular to

ovoid, calyx and berry readily shed when ripe. *Seeds* 1.5 mm long, discoidal, light brown, an average of 191 in 10 fruits counted.

Distribution

Doubtfully naturalised in Western Australia.

Note

P. pubescens is native to northern and central America where it is widespread. It is now almost pan tropical in distribution. The few and irregular collections in Australia suggest that it is doubtfully naturalised. It is known to be cultivated as a virus test plant in some research centres.

Specimens examined (all cited)

WESTERN AUSTRALIA: *Gardner s.n.*, Aug.-Sept. 1938, Yatheroo in limestone caves (PERTH); *Price s.n.*, 20.ii.1959, Bowelling (PERTH).

NEW SOUTH WALES: *Cheel s.n.*, s.d., cultivated by H. Rumsey at Dunbar (NSW).

VICTORIA: *Warner's Garden s.n.*, 20.iii.1898, Coker Dam (nr Dimboola) (MEL).

8. *P. virginiana* Mill., Gard. Dict. ed. 8 (4) (1768).

Type Citation: None cited. "Winter cherry with an herbaceous stalk and oval spear shaped leaves which are acutely indented".

Type Material: Possibly at BM, not seen.

P. virginiana var. *sonorae* (Torr.) Waterfall, Rhodora 60 (1958) 154.

P. pumila Nutt. var. *sonorae* Torr., Botany of the Mexican Boundary (1859) 153. *Basionym*.

Type: Waterfall l.c. cites Geo. Thurber 418, Fronteras, Sonora, Mexico, June 1851, at NY with two isotypes at GH. Not seen by me.

Herbaceous *perennial* 30-50 cm high, with extensive rhizomatous root system. Sparsely pubescent on young-parts with minute, curved, appressed, antrorse simple hairs, glabrescent. *Leaves* to 9 x 3.5 cm but commonly c. 6 x 2 cm, elliptic, entire or with a few weakly developed lobes or teeth, apex acute to acuminate, base cuneate. *Petiole* 1.5-3 cm long, grooved above. *Inflorescence* of solitary flowers from leaf axils and stem forks. *Pedicels* c. 1 cm long. *Calyx* 10-12 mm long, divided about half way into acuminate triangular lobes. *Corolla* 10-12 mm long, rotate, the lobes scarcely evident, greenish-yellow (one report, not seen fresh), with darker spots at the base of each petal, pubescent below the spots and between the anthers. *Filaments* 3-4 mm long, somewhat thickened and swollen about the middle. *Anthers* 3.5-4 mm long, yellow, pollen white. *Ovary* c. 2.5 mm long, bluntly conical. *Style* 6-8 mm long, glabrous. *Stigma* somewhat expanded. Fruiting pedicel not much enlarged; calyx 1.5-2.5 cm long to 1-2 cm wide (herb. spec.) more or less 10-angled, *berry* c. 1 cm diam. colour not noted.

Distribution

See Map 5.

Notes

This species is primarily a weed of cultivation and several collections report that it forms large clonal patches. Only one collection, *Leys*, Nea, has details of soil type "black self mulching soil" and *Hyland*, Geurie, states "stock will not eat this weed". In contrast to most *Physalis* collections this species does not appear to fruit very freely and only one third of the collections seen bear any fruit. The fruits are relatively smaller than most other *Physalis* in Australia. It may be distinguished from *P. lanceifolia*, to which it bears some resemblance in foliage, by its rhizomatous root stock, shorter pedicel, longer calyx with longer narrower lobes, larger corolla, the inflated filaments and longer anthers;

from *P. philadelphica* by its rhizomatous habit, narrower leaves, longer calyx with narrower lobes, greenish-yellow corolla, inflated filaments, straight anthers and smaller calyx and berry. Willis (1972, p. 548) refers to this species in a note as *P. angulata* L.

Waterfall (1958, p. 142) describes seven varieties and one form and later (Waterfall, 1967, p. 118) adds a further two varieties. In north and central America it is obviously a widespread and variable species complex. The name *P. macrophysa* Ryd. (reduced by Waterfall to a form of *P. virginiana*) has been applied to some Australian collections, but as this form has calyces 4-5 cm long and 3-4 cm wide it obviously does not apply here.

Specimens examined (all cited)

QUEENSLAND: *Bailey s.n.*, ?1906, ?Gatton (BRI); *Liverseed s.n.*, Jan. 1919, Hermitage State Farm (BRI); *Compagnoni s.n.*, 3.i.1927, Wondai (BRI); *Shire Clerk s.n.*, Feb. 1937, Glengallan Shire, Warwick (BRI); *Beichtel s.n.*, Jan. 1947, Hermitage nr Warwick (BRI); *Pink 124*, Sept. 1947, Hermitage nr Warwick (BRI); *Lee s.n.*, 17.iv.1961, between Warwick and Freestone (BRI); *Gillam s.n.*, 28.i.1966, 1 mile from Brookstead (BRI, NSW); *Robinson s.n.*, 5.xii.1967, 6 miles NW of Wondai (BRI); *Porter s.n.*, 29.i.1971, 5 miles SW of Pittsworth (BRI).

NEW SOUTH WALES: *Anon s.n.*, Feb. 1928, Molong (NSW); *Shire Clerk s.n.*, Dec. 1935, Cudal (NSW); *Nicholson s.n.*, May 1936, Coonabarabran (NSW); *Nicholson s.n.*, 6.ii.1937, Coonabarabran (NSW); *Standing s.n.*, 5.i.1945, Tamworth (NSW); *Caldwell s.n.*, Feb. 1949, Manilla (NSW); *Ross s.n.*, 7.i.1952, Wellington (NSW); *Weeds Inspector s.n.*, Feb. 1954, Mandowla Shire, Manilla dist. (NSW); *Lisle s.n.*, 5.iii.1957, Quirindi dist. (NSW); *McNamara s.n.*, Jan. 1962, Quirindi (NSW); *Hyland s.n.*, Dec. 1968, "Glenore", Geurie (NSW); *Leys s.n.*, 27.xii.1977, Nea, nr Gunnedah (NSW).

VICTORIA: *Pye s.n.*, 1907, Dookie (MEL); *Pye s.n.*, Jan. 1909, Dookie (MEL); *MacBarron s.n.*, 21.iii.1951, Wodonga (NSW).

9. *P. viscosa* L., Sp. Pl. (1753) 183.

Type Citation: "Habitat in Virginia, Bonaria 2".

Type Material: Not seen (Microfiche Herb. LINN, AD!).

An herbaceous *perennial* to about 30 cm high, with an extensive rhizomatous root system from which new plants arise. Sparsely pubescent with minute forked hairs (lens necessary). A few plants have bluntly conical hairs but then usually have a few forked hairs on the calyx margins. Lower *leaves* to 5 x 3 cm, ovate-lanceolate, upper *leaves* about 3 x 1 cm, lanceolate, apex acute, base cuneate, often oblique; *petiole* 0.5-2 cm long, narrowly winged above. Flowers solitary, pedicellate from leaf axils and stem forks. *Pedicel* c. 1 cm long. *Calyx* 9-10 mm long, divided about half way into triangular lobes, minutely pubescent. *Corolla* c. 13 mm long, 2-2.5 cm diam., rotate-pentagonal, petal apices broadly rounded, acumens c. 1 mm long, pale yellow with dark olive-yellow spots towards the base, densely pubescent below the spots and between the filaments. *Filaments* 3-5 mm long unequal, glabrous, white. *Anthers* 3-3.5 mm long, oblong, creamy white, pollen white. *Ovary* 2 mm diam. bluntly conical, disc conspicuous, fleshy, pale orange-yellow. *Style* c. 9 mm long, erect, glabrous. *Stigma* capitate, scarcely expanded. Fruiting calyx to 2 x 1.5 cm, enclosing berry. *Berry* c. 1 m diam. finally greenish yellow. *Seeds* 2-2.25 mm long, discoidal, light brown. *Cotyledons* c. 11 x 4 mm, lanceolate, minutely glandular pubescent towards the base, hypocotyl 1-1.5 cm long, minutely pubescent.

Distribution

See Map 5.

Notes

This species has become widely naturalised and weedy in southeastern Australia. Its identity has proved troublesome and Australian herbarium specimens have been labelled *P. angulata*, *P. macrophysa* and *P. lanceolata*. Waterfall (1958, p. 133) describes several varieties and forms, most of which are either much more pubescent, have more complex

hairs, or differ in leaf shape. However, material sent to him (ADW 40808, ex Wolsely, South Australia) was identified by him as *P. viscosa* with the comment that it best matched material from South America. A specimen at ADW, *Conrad 2363* collected near Santa Rosa, Argentina, identified by W. D'Arcy and distributed from Missouri Botanical Gardens matches the local material very well.

The specimens have frequently been collected from railway lines or yards. For an extended account of this species in Victoria see Parsons (1973, p. 263) under *P. lanceolata* Michx. where both a map of distribution and illustrations are given. Eichler (1965, p. 273) tentatively used the name *P. hederæfolia* Gray for this species.

Selected specimens

WESTERN AUSTRALIA: *Gardner s.n.*, Mch 1942, Bunbury, in waste places (PERTH).

QUEENSLAND (all cited): *Balderson s.n.*, 12.i.1936, Goomburra via Allora (BRI); *Kyle s.n.*, 16.ii.1936, Clifton, "Glenore", Leyburn Rd (BRI, CANB, NSW); *Roe 28*, 3.xii.1937, Goondiwindi (CANB, BRI); *O'Donnell s.n.*, 4.i.1940, Lowood (BRI); *Mengel s.n.*, 28.ii.1949, Felton, Cambooya (BRI); *Klose s.n.*, Apl 1958, Toowoomba (BRI);

NEW SOUTH WALES (selected from 42 specimens examined): *Milvain s.n.*, 28.v.1975, Lockhart (ADW, BRI, K, NSW); *Toms s.n.*, 7.iv.1978, Saverlake (ADW, NSW); *Horton s.n.*, 1979, ex Saverlake (ADW, CANB, NSW, MO).

VICTORIA (selected from 16 specimens examined; see map in Parsons, 1973, 263, sub *P. lanceolata*): *Aston 519*, 8.ii.1960, Kow Swamp, W of Gumbower (AD, MEL, K, NSW); *Smith 64/133*, 25.v.1964, Charlton Railway Yard (AD, MEL); *Pemberton s.n.*, 23.ii.1924, Horton Church, Leitchville (ADW, MEL).

SOUTH AUSTRALIA (all cited): *Black s.n.*, Feb. 1890, Dec. 1909, 13.i.1950, South Rd, Flagstaff (AD); *Johnson s.n.*, 29.iv.1941, Pt Noarlunga (AD); *Cleland s.n.*, 7.i.1950, nr Tapleys Hill (MEL); *Eichler 12166*, 23.ii.1956, Darlington, at foot of Tapley's Hill (AD, OKLA); *Dept of Agric. 524*, 24.v.1965, Wolsley (ADW); *Symon s.n.*, 15.xi.1966, grown from *Dept of Agric. 524*, ex Wolsley (AD, ADW, B, CANB, K, NSW); *Dept of Agric. 365*, Jan. 1969, Naracoorte (ADW); *Dept of Agric. 5954*, 1.ii.1972, Keith (ADW); *Garrick s.n.*, 1.iii.1972, Keith along railway line (AD, ADW, CANB, K).

10. SALPICHROA Miers

Miers in Hook., London Journ. Bot. 4 (1845) 321.

Scrambling or climbing soft-wooded *perennials*. *Leaves* alternate or opposite, simple, ovate shapes. *Pubescence* of simple hairs. *Flowers* solitary, pedicellate axillary. *Calyx* deeply 5-lobed. *Corolla* urceolate or tubular, 5-lobed. *Stamens* inserted about the middle of the corolla-tube. *Filaments* straight, glabrous. *Anthers* narrow, sagittate below, splitting along their full length. *Ovary* surrounded by annular fleshy disc. *Style* filiform. *Stigma* subcapitate. *Fruit* a berry, succulent, red or white. *Seeds* compressed, rugulose.

A genus of about 22 species from South America. One species has been widely cultivated as an ornamental and in many areas has become weedy.

1. *S. origanifolia* (Lam.) Baill., Hist. Pl. 9 (1888) 288.

Physalis origanifolia Lam., Tabl. Encycl. 2 (1797) 28. *Basionym*.

Type Citation: "Ex Magellania, An ph. curassavica. 1".

Type Material: Not seen.

Salpichroa rhomboidea (Hook.) Miers, London J. Bot. 4 (1845) 326.

Atropa rhomboidea Hook., Bot. Misc. 1 (1829) 135, t. 37. *Basionym*.

Type Citation: "I am indebted to Dr. Gillies not only for the specimens from which the accompanying figure is made, but also for a description made from the living plant in its native country".

Type Material: Not seen.

Common Name: pampas lily of the valley; cocks eggs.

Scrambling *perennial* to several m long with stout rootstock and rhizomes from which new plants emerge, older stems quadrangular with pale corky epidermis. Younger stems, twigs, petioles, upper and lower leaf surface sparsely or densely pubescent with antrorse, curved, several celled, simple hairs, unarmed. *Leaves* to 5 x 3 cm but mostly c. 1.5 x 1 cm, ovate to ovate-rhombic, entire, alternate in unequal sized pairs the smaller leaf c. $\frac{3}{4}$ the size of the larger; *petiole* 0.5-2.5 cm, mostly c. 0.7 cm. *Inflorescence* a solitary pendulous flower in the leaf axils. *Pedicel* 7-10 mm long slender, calyx tube c. 1.5 mm long, campanulate, the lobes c. 2 mm long, narrowly triangular. *Corolla* c. 7 mm long, urceolate, the lobes joined in a tube except at their apex which is c. 2 mm long, triangular, reflexed, glabrous except for minute papillose hairs at the apex, white or cream. *Filaments* adnate to the tube for most of their length the final 2-3 mm free; *anthers* c. 2 mm long, sagittate below, splitting along their full length, somewhat exserted. *Ovary* c. 2 mm long, broadly conical, glabrous, lower portion surrounded by a prominent annular fleshy disc. *Style* 5 mm long, erect, pubescent in lower half. *Stigma* capitate and not exceeding the anthers. *Berry* 13-18 x 7-8 mm, bluntly conical, succulent, aromatic, translucent when ripe, white to pale yellowish. *Seeds* about 2 mm diam., discoidal, hirsute if cleaned gently, with a narrow wing 0.25 mm wide along the margin, an average of 14 seeds per berry in seven fruit counted.

Distribution

In all States except Tasmania. Map 3.

Notes

A genus of about 25 species mainly in tropical America. One species was originally cultivated and is now naturalised in southern Australia, mostly found in urban areas and often difficult to eradicate because of its extensive root system. The earliest collections are from Victoria in 1916, but it was obviously soon distributed and was established in South Australia in 1925 and New South Wales by 1932. For an account of the species in South Australia see Richardson (1953) and in Victoria with map and illustrations see Parsons (1973). The common name pampas lily of the valley obviously refers to the similarity of the flowers to *Convallaria*; the name cocks eggs may have arisen from the similarity of the ripe fruit to cocks testicles, not seen so often since Col Sanders invaded Australia. For an account of the alkaloids in this species see Evans et al (1972).

Selected specimens

WESTERN AUSTRALIA (three collections seen): *Royce s.n.*, 20.ii.1953, Tuart Hill (K, PERTH); *Paterson s.n.*, 28.iii.1969, Perth (PERTH).

QUEENSLAND: *Wetherall s.n.*, 6.iii.1962, Ipswich, property of W. Roberts, York St (BRI).

NEW SOUTH WALES (selected from 29 specimens examined): *Rodway 953*, 21.xi.1932, Nowra, Bridge Rd, garden weed vigorous amongst other plants (NSW); *Pearson s.n.*, Mch 1941, Dubbo (NSW); *Matthews s.n.*, 13.v.1942, Corowa District (NSW); *Schmidt s.n.*, 21.vi.1943, Ungarie (NSW); *McLachlan s.n.*, Mch 1948, Canberra, weed in garden (CANB, NSW); *Moore s.n.*, Oct. 1948, Gooloogong (NSW); *Green s.n.*, Oct. 1949, Hunters Hill (NSW); *McLean s.n.*, 13.ii.1951, Orange district, growing on slate soil in backyard (NSW); *Curtin 252*, 6.x.1953, Forbes, common weed in garden (NSW); *Maitland Ware s.n.*, 28.ii.1957, Narrandera, in a garden in the town (NSW); *White s.n.*, 17.ii.1968, Condobolin, in domestic garden (NSW); *Whaite s.n.*, 3.iii.1973, Goulbourn, vacant land, Combermere St (NSW); *Allen s.n.*, Jan. 1974, Bourke, unused garden in town block (NSW).

VICTORIA (ten collections seen): *Semmens s.n.*, Jan. 1916, creeping in hedge at Black Rock (MEL); *French s.n.*, 17.iii.1919, Burnley & Camberwell, spreading (MEL); *Fricke s.n.*, May 1920-30, Sandringham (ADW); *Leaney s.n.*, May 1950, MacArthur-Byaduk district (ADW); *Beaglehole 30555*, 19.ii.1969, Grampians N of Wannon Bridge, N of Dunkeld, spreading (MEL); *Browne s.n.*, June 1977, Redcliffs township, neglected backyard (MEL); *Muir 5496*, 3.vi.1977, Glen Iris, Hayes Crescent, on waste land beside creek (MEL).

TASMANIA: *Woodforde s.n.*, 29.x.1951, Burnie, escape from cultivation (HO).

SOUTH AUSTRALIA (nine collection seen): *Ising s.n.*, Apl 1925, Adelaide, Marryatville Rd (AD); *Black s.n.*, Apl 1925, Adelaide, Kensington Rd (AD); *Eardley s.n.*, 1942, Hundred of Joanna, 16 miles E of Naracoorte at "Dunholm" on Vict. border (ADW); *Dunston s.n.*, 22.ii.1946, Payneham Rd, Adelaide (AD); *Tideman s.n.*,

1.iv.1959, Mrs Salmon's property c. 5 km NW of Berri on Monash Rd (AD, BM, K, L, NSW, UC); *Amisberg s.n.*, 26.viii.1971, Adelaide suburb, Royal Pk (AD, B, W); *Symon 11027*, 5.vii.1978, Adelaide suburb, Norwood, in waste place (AD, ADW, B, BH, CANB, K, L, MO).

11. WITHANIA Pauquy

Pauquy, Diss. Bellad. (1825) 14.

Shrubs. Leaves alternate or opposite, simple, entire. Pubescence of dendritic hairs. *Flowers* solitary or in axillary clusters. *Calyx* campanulate, 5-lobed. *Corolla* campanulate 5-lobed. Stamens 5, equal, inserted near base of corolla. *Anthers* erect, included. *Style* slender, erect. *Stigma* capitate. Fruit a globose *berry* enclosed in the inflated calyx. *Seeds* subreniform.

A small genus of about 10 species found in western Asia and north Africa. Although frequently placed near *Physalis* because of the inflated calyx there is little evidence that they are in any way related. Several species have long been grown as drug plants.

1. *W. somnifera* (L.) Dunal in DC., Prodr. 13 (1852) 453.

Physalis somnifera L., Sp. Pl. (1753) 182. *Basionym*.

Type Citation: "Habitat in Mexico, Creta, Hispania".

Type Material: Not seen.

A *shrub* to about 1 m tall, erect, sparsely branched, woody below. All parts grey pubescent with dendritic hairs, dense on stems, petioles, and young growth, sparse on older surfaces, unarmed. *Leaves* to 8 x 4.5 cm commonly about 5 x 3 cm, ovate, apex acute or obtuse, base shortly cuneate, petiole c. 1 cm long. *Inflorescence* a congested cluster of 4-6 flowers in the leaf axil. *Pedicels* 3-5 mm long; *calyx* tube c. 2 mm long, the lobes 2-3 mm long, shortly triangular and including the linear acumen. *Corolla* 5-6 mm long, the tube campanulate the linear stellate lobes cut to about the middle, drab yellowish green. *Filaments* c. 3 mm long, slender. *Anthers* 1 mm long, ovate. *Ovary* bluntly conical, glabrous. *Style* 3 mm long, erect; *stigma* capitate. *Berry* 5-10 mm diam. globular, shining red, succulent included within the inflated calyx tube 1.5-2 cm long, orifice small, the apex of the calyx lobes scarcely enlarged. *Seeds* irregular discoid about 2 mm long, light brown, minutely reticulate, about 35 per berry.

Notes

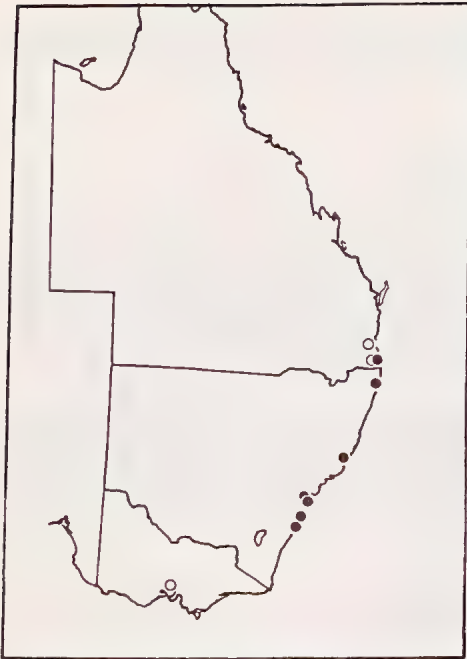
This genus of about 10 species occurs in North Africa and in the Mediterranean basin eastwards to India where it is cultivated as a drug plant (Atal & Schwerting, 1962).

A single species is locally established near Port Lincoln, S.A. (Johnston, 1949) and in NSW. In both cases the plants appear to grow on shallow rocky soils.

Specimens examined (all cited)

NEW SOUTH WALES: *Doyle s.n.*, Sept. Eden Vale, Vacy (NSW); *Readett s.n.*, 13.vi.1966, Glendonbrook Creek, Myall Reserve, few plants on rocky knoll (NSW).

SOUTH AUSTRALIA: *Johnston s.n.*, Mch 1949, Pt Lincoln (ADW); Nov. 1950, Dec. 1950, "The Duckponds" nr Pt Lincoln (AD); *Alcock 504*, 21.ii.1965, "Tulka", nr Pt Lincoln (AD); 11.iv.1965, "Tulka", Hd of Sleaford, Sect. 519 (ADW); *Symon 11837*, 27.ix.1979, Eyre Peninsula, nr Tulka S of Pt Lincoln (AD, ADW, CANB, K, MO, PERTH; cutting from this collection cultivated ADW).

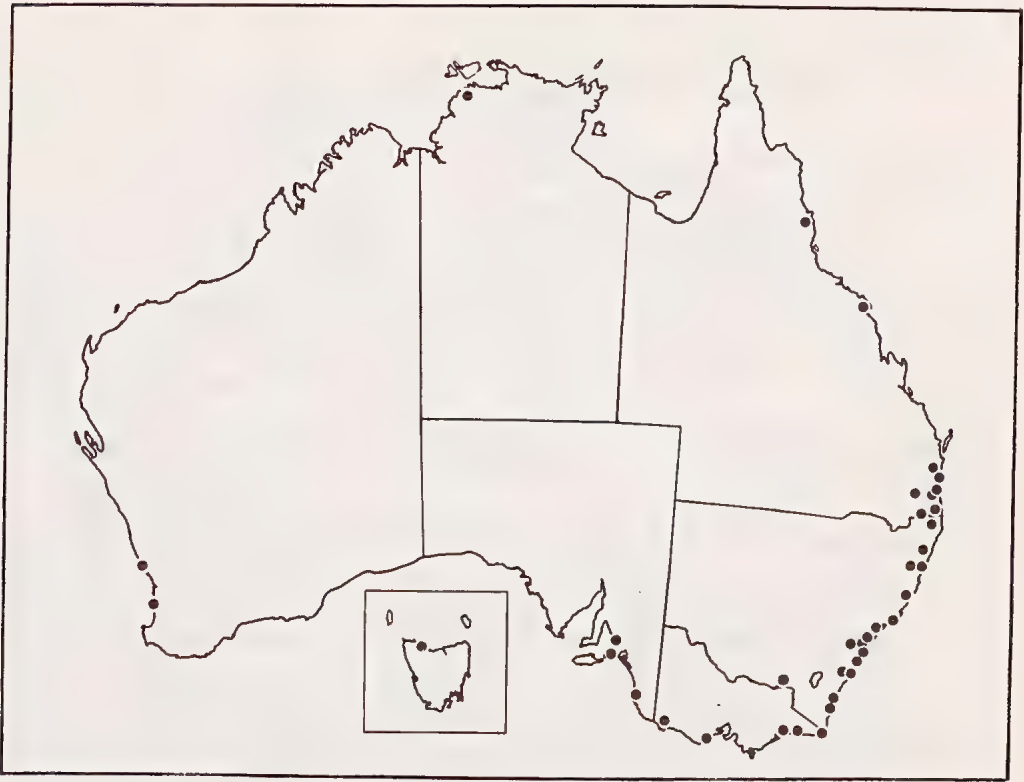


Map 1. Distribution of *Cestrum aurantiacum* (spots) and *C. elegans* (circles).

Map 2. Distribution of *Cestrum parqui*.



Map 3. Distribution of *Salpichroa organifolia* (spots) and *Capsicum annuum* var. *glabriusculum* (circles) and *C. frutescens* (triangles).



Map 4. Distribution of *Physalis peruviana*.



Map 5. Distribution of *Physalis viscosa* (spots), *P. virginiana* (circles) and *P. lanceifolia* (triangles).



Map 6. Distribution of *Physalis minima* (spots) and *P. ixocarpa* (circles).

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